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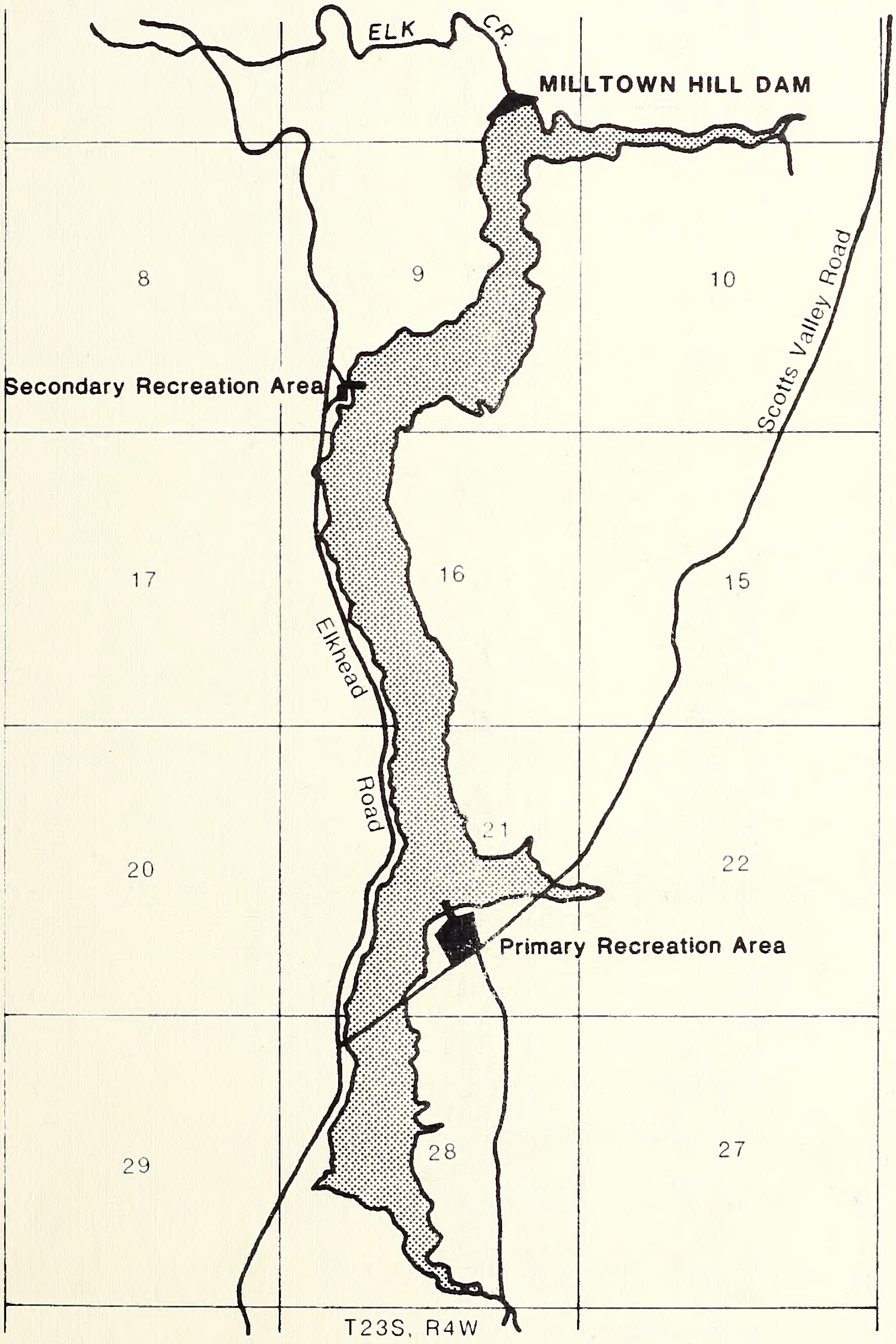

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ENVIRONMENTAL IMPACT STATEMENT

MILLTOWN HILL PROJECT
ELK CREEK SUBBASIN, UMPQUA RIVER BASIN
DOUGLAS COUNTY, OREGON

U.S. DEPARTMENT OF THE INTERIOR, BUREAU OF RECLAMATION
IN COOPERATION WITH
THE ROSEBURG DISTRICT BUREAU OF LAND MANAGEMENT

This Environmental Impact Statement addresses the construction and operation of the proposed Milltown Hill Project. The project consists of a 186-foot high dam and 24,143-acre foot reservoir on Elk Creek which would provide regulated flows of water for irrigation of up to 4,661 acres of arable land, storage and distribution of water to the cities of Drain and Yoncalla and the community of Rice Hill, allowing for municipal expansion and industrial diversification, provide a reliable source of water for domestic use, provide opportunities to improve fish and wildlife habitat, improve water quality, and provide new water-related recreational facilities. It would also provide limited flood control in and near the city of Drain, and provide the opportunity to secure 767 additional acres of habitat for the Columbian white-tailed deer as a project mitigation measure. A portion of the stored water would be released directly into Elk Creek to enhance water quality and anadromous fish habitat, and to meet the out-of-stream needs of municipal, industrial, and agricultural users. The remainder of the stored water would be released into a pipeline distribution system which would improve municipal, industrial and irrigation water supplies to Scotts Valley and Yoncalla Valley, and provide an additional water supply for rural domestic use in these areas. This Environmental Impact Statement also addresses the No Action Alternative, and fulfills the requirements of Executive Order 11988 (Floodplain Management) and Executive Order 11990 (Protection of Wetlands).

For further information regarding the Environmental Impact Statement, contact:

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SUMMARY

Purpose

The purpose of the Milltown Hill Project, a 24,143 acre-foot reservoir and pipeline distribution system 18.5 miles long in the Elk Creek subbasin (Umpqua River Basin) of western Oregon (Figure S-1), is to fulfill a portion of the existing and projected needs of urban and rural water users. The project would:

- Provide increased water supplies during the growing season through an irrigation system, to provide irrigation water for up to 2,601 acres of arable land in Yoncalla and Scott's Valley, and allow pumping of water directly from Elk Creek to irrigate up to an additional 1,163 acres of arable lands along Elk Creek. A supplemental supply would be provided to 897 acres.

- Provide for the storage and distribution of water to the cities of Yoncalla and Drain and the community of Rice Hill, allowing for municipal expansion and industrial diversification.

- Provide a reliable source of water for rural domestic use in the areas served by the pipeline system.

- Provide opportunities to improve fish and wildlife habitat.

- Improve water quality in Elk Creek and Yoncalla Creek.

- Provide new water-related recreational facilities.

- Provide limited flood control, in and near the city of Drain.

Need

Historically, Douglas County has relied on the forest products industry to be its main economic contributor. Timber receipts account for 70 percent of the County's revenue. In recent decades the forest products industry has been subject to unpredictable markets for its products. This condition results in seasonal and sometimes protracted unemployment, which in turn causes significant losses of revenue for the County. When such conditions exist, the County is unable to provide continuing optimal services to its residents. Douglas County has, for decades, searched for means to diversify its industrial base in the hope of stabilizing its economy. In 1985, the Bureau of Reclamation and the Douglas County Water Resources Survey initiated the Northern Douglas County Water

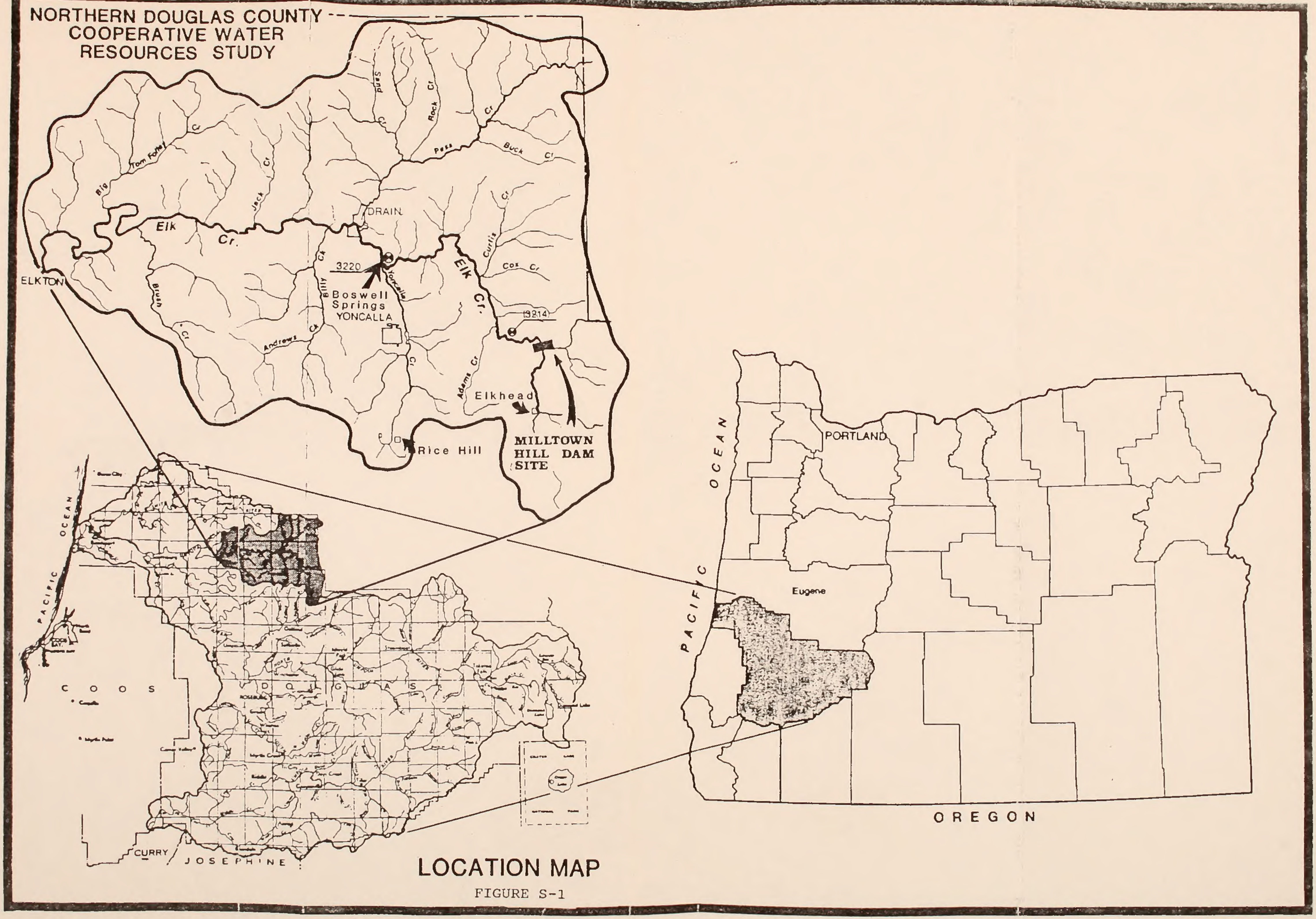
Resources Study to find solutions to the resource needs in the Elk Creek subbasin.

The primary socio-economic problem in the Elk Creek subbasin is the lack of opportunities for industrial growth and diversification. This problem has been on-going for decades. The area has historically been dependent on one industry, the forest products industry. The privately-owned, old growth timber base supplying the resource for the industry has been almost completely depleted after forty to fifty years of harvesting. Changes in wood processing techniques, competition for government-owned timber, high stumpage and processing costs, and unpredictable markets have forced most processing plants in the Elk Creek subbasin out of business. The future of this industry remains uncertain, especially since recent region-wide controversy has been generated over the future management of old-growth forests and the protection of the Northern spotted owl, a federally designated threatened species.

The tourist industry, an important economic factor in Douglas County, is not a viable income producing alternative in the Elk Creek subbasin. There are no destination resorts to attract tourists and water-related recreational opportunities are not available in the Elk Creek subbasin. There are no federal or state parks.

The economy of the area is not likely to improve unless opportunities are made available for industrial diversification. The Milltown Hill Project presents one opportunity. The key to industrial and economic diversity is the availability of water. Cooperative investigations between Douglas County and the Bureau of Reclamation have found that the area suffers from the lack of year-round supplies of quality water for municipal, industrial and irrigation use. Lack of water has inhibited economic growth in the Elk Creek subbasin. Construction and operation of the Milltown Hill project would store and supply the necessary amounts of water for municipal growth, industrial diversification, and improved agricultural development. The project would improve anadromous fish habitat, water-related recreational activities, and provide some flood control. Water quality would also be improved.

As a result of the findings of these studies, Douglas County applied to the Bureau of Reclamation for a loan under the Small Reclamation Projects Act (SRPA) (P.L. 84-984) to construct and operate the Milltown Hill Project. This action was taken in May, 1991.



LOCATION MAP

FIGURE S-1

Alternatives Considered but not Evaluated

Both structural and non-structural alternatives for alleviating water shortages were investigated. Selection of alternatives to be investigated was based, primarily, on the criteria of water availability and yield, water needs of agricultural and urban areas, environmental impacts, cost-effectiveness, and acceptability to the public.

Storage sites investigated on tributaries of Elk Creek and on Elk Creek mainstem are summarized in Table S-1 and are shown in Figure S-2. Other structural alternatives considered were interbasin transfer of water and ground water pumping. Non-structural alternatives considered were purchase of irrigation water and conservation. These latter alternatives were discarded because it would be counter to the proposed diversification of a water-use employment base, costs were prohibitive or water yield was not sufficient. In addition, active conservation programs are in effect in both Drain and Yoncalla, and additional reasonable measures would not significantly affect water use.

Preferred Alternative

Project Features

The preferred alternative, the Milltown Hill Project, would meet all of the municipal and industrial water needs through the year 2030, and perhaps beyond. Instream habitat needs for anadromous fish would be enhanced between the dam and the mouth of Elk Creek. Livestock would be fenced from riparian areas needing improvement. Gravel would be deposited in Elk Creek to improve spawning conditions. Locations of these areas needing improvement have been tentatively identified (Fish and Wildlife Coordination Act Report, USFWS, Aug 17, 1990). The irrigation component provides for irrigation of some new lands and supplemental needs. It would not provide enough water to develop all arable lands. However, owner interest surveys show that the preferred alternative would likely meet the water needs of the majority of those interested in irrigation. The preferred alternative would provide a reduction in flood levels in the city of Drain.

The preferred alternative would consist of a 24,143 acre-foot reservoir at river mile 39.4 on Elk Creek. A 179 foot-high dam (hydraulic height) would inundate 680 acres of land at the 775 foot mean sea level (msl) elevation at normal full pool. The reservoir would inundate about 4 1/2 miles of Elk Creek and 2 miles of tributaries (Figures S-2 and S-3).

The total storage capacity of 24,143 acre-feet would be allocated among its principal uses. The allocation includes 937, Table S-1. Structural and Non-structural Alternatives Investigated.

ALTERNATIVES	FINDINGS
1. Structural	
A. Sites Located on Elk Creek Tributaries	
Billy Creek	-Insufficient water yield -High costs of pumping water to service area in Scotts Valley and Yoncalla Valley.
Adams Creek	-Small yield -Geological conditions would provide for a reservoir of only 2,000 acre-feet; not adequate for service area needs.
Wise Creek	-Inadequate yield. -Slide potential on both abutments.
Shoestring Valley (Walker Creek)	-Yield of only 12,500 acre-feet. -Larger reservoir would be cost prohibitive.
B. Sites Located on Elk Creek Mainstem	
Drain (McClintock)	-Would inundate Scotts Valley service area. -Prohibitive costs of I-5 relocation. -Loss of Scotts Valley service area. -High cost of pumping to service areas in Yoncalla Valley.
Scotts Valley (Elk Creek)	-Would inundate Scotts Valley service area. -Would inundate I-5. -Loss of Scotts Valley service area. -High cost of pumping to Yoncalla Valley service area. -High cost of I-5 relocation
Yoncalla Single Purpose	-Unacceptable to local Douglas County Water Resources Management Plan and the Oregon Water Resources Commission's Basin Program Statement. Would serve the needs of Yoncalla Valley only.
Site 2	-Inadequate reservoir capacity.
Site 4	-Inadequate reservoir capacity.
Site 6	-Geologically inadequate.
Site 8	-Geologically inadequate.
Site 10	-Geologically inadequate.
Site 12 (Preferred Alternative)	-Meets all needs of service areas. Geologically acceptable
Site 14	-Geologically inadequate.
Site 16	-Geologically inadequate, working room for dam construction not adequate.
C. Other Structural	
Interbasin Transfer	-Institutional constraints. -Inadequate water supply.
Ground Water Pumping	-Inadequate water supply. -High pumping costs.
2. Non-Structural	
Purchase of irrigation	-Counter to diversification of water employment base. -Would apply to Drain only because Yoncalla would have no source.
Conservation	-Active Conservation programs are in effect.

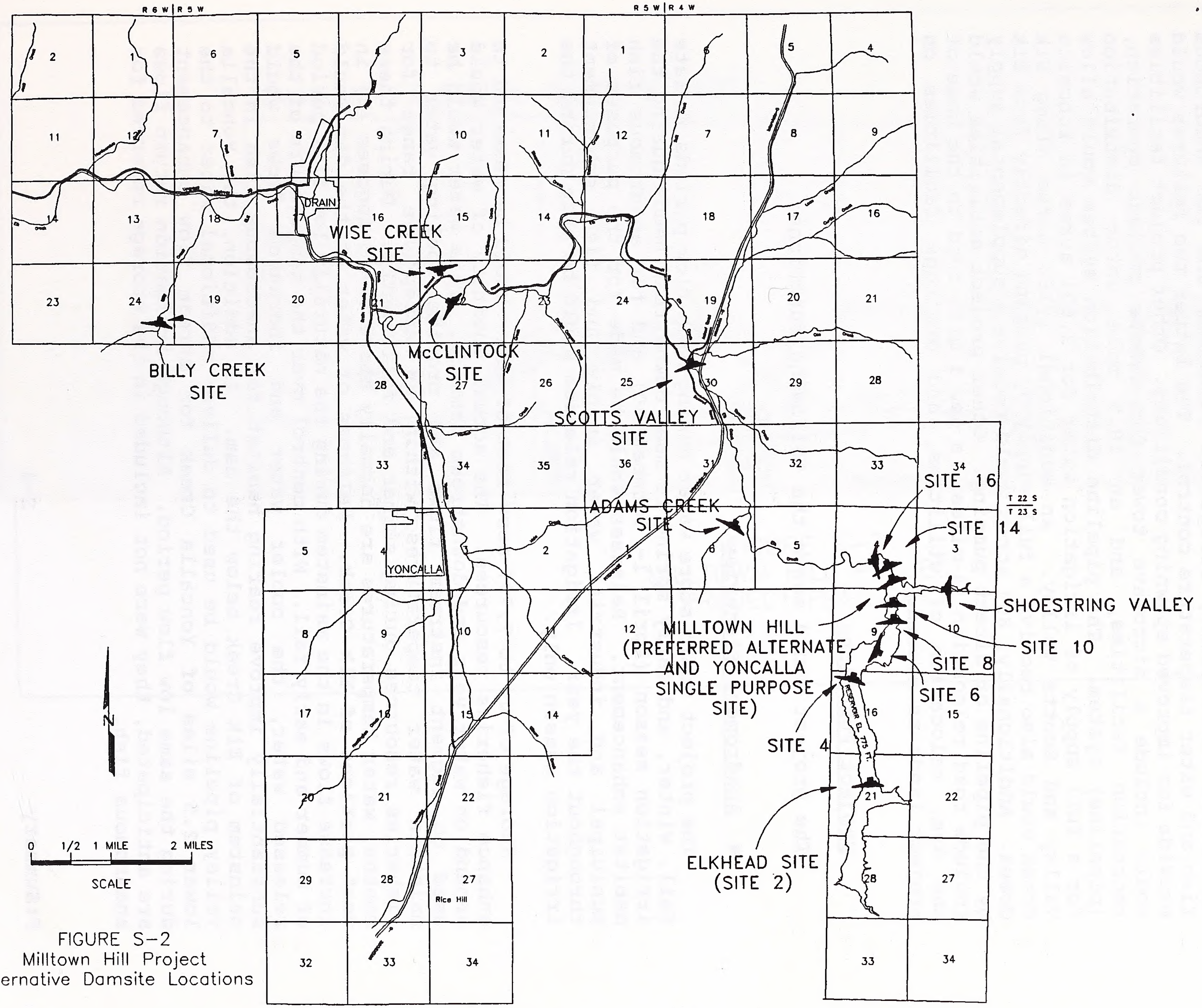


FIGURE S-2
Milltown Hill Project
Alternative Damsite Locations

9,654, and 7,737 acre feet, respectively for municipal and industrial development, irrigation releases, and for anadromous fish and water temperature control. The latter two features would provide for improved spawning conditions. Other project facilities would include a microwave tower for remote project operation, recreation facilities, and an 18.5 mile water distribution (pipeline) system. The pipeline distribution system would allow for a full supply of irrigation water for 2,601 acres in Yoncalla Valley and Scotts Valley. An additional 1,163 acres along Elk Creek would also receive a full supply by pumping directly from Elk Creek. Additionally, 897 acres would receive a supplemental supply by the pipeline or direct pumping. Other project activities would include road relocation (4 miles), a new 1 mile road to the base of the dam, relocation of utilities, and drainage facilities on project lands as needed.

Project Functions

The project would serve the following functions:

- Anadromous Fisheries

The project would store water during high flow periods in late fall, winter, and early spring to meet downstream needs during the irrigation season (April 1- October 30) and for anadromous fish habitat enhancement. Releases would be made for the purposes of municipal and industrial water supply and fish enhancement throughout the year. Irrigation releases would be made during the irrigation season only.

Storage of up to 7,737 acre-feet of water would be reserved to enhance fisheries resources. The actual quantity of water would depend on water year and downstream demands. This water would be used to augment instream flows and provide cooling water to maintain water temperatures within an acceptable range for fisheries resources during summer and fall months. During these months, water temperatures are normally above 65-75 degrees (F) in most portions of Elk Creek. Releases of water at the dam would increase flows in the mainstem during the naturally low flow period of summer and early fall. With control over the temperature of the released water, the cooler water and increased flows would substantially improve rearing habitat for anadromous fish in the mainstem of Elk Creek below the dam. In addition, the Yoncalla Valley pipeline would be used to deliver additional water to the lower 2.5 miles of Yoncalla Creek for stream flow enhancement during the same low flow period. Although irrigation return flows are anticipated, they were not included in the storage reserved for anadromous fish.

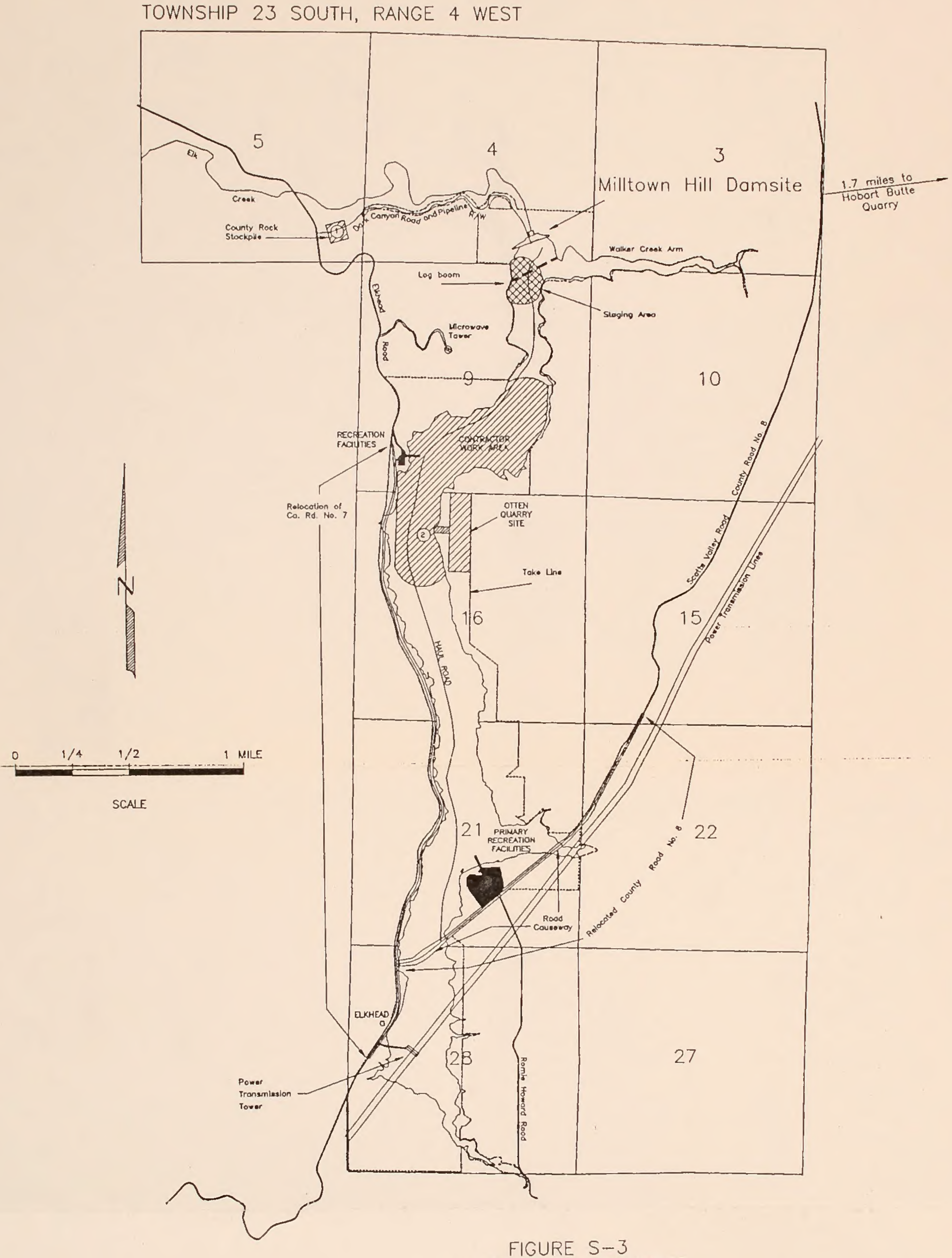


FIGURE S-3
MILLTOWN HILL PROJECT
PROJECT FEATURES

Stored releases for fish enhancement would be protected from appropriation by an instream water right that the Oregon Department of Fish and Wildlife would receive from the Water Resources Department. Log or gabion structures would be placed across Elk Creek in certain areas to trap gravels for spawning purposes. Due to the lack of natural gravel recruitment, additional gravel would be placed along with the gravel holding structures. Approximately 8,000 square feet of gravel will be placed between river miles 39.4 and 34.4, 33,000 square feet between river miles 34.4 and the mouth, and 4,000 square feet of gravel in the lowest reaches of Adams and Yoncalla Creeks. All gravel placements would be one foot in depth.

The potential problem of fish passage at Cunningham Dam would be evaluated by conducting fisheries surveys during the migratory period for anadromous fish.

The project would include measures to improve between 1 and 2 miles of riparian habitat along Elk Creek below the dam. Areas in need of habitat improvement are also located between Scotts Valley and Boswell Springs and in the Putnam Valley area. Improvements would include vegetative plantings and fencing to protect the existing and improved riparian areas from livestock grazing.

- Water Quality

Water quality is generally good in Elk Creek except during summer months (June through October) when flows are less than 5 cfs and frequently at 0 cfs. Low flows cause temperature and dissolved oxygen problems. Treated domestic waste discharge from communities further exacerbates these problems. The project would increase summer flows to 30 to 40 cfs at Boswell Springs (river mile 26.5) to dilute waste discharges in Yoncalla and Elk Creeks.

- Municipal and Industrial Water

The present limited water supply for Yoncalla and Drain would be supplemented and sufficient until about the year 2030. The Rice Hill area, which suffers from degraded ground water from petroleum spills and has no surface water supply, would be sufficiently near the pipeline to allow purchase of water. The pipeline would also have fire hydrant turn-outs along its length to provide a source of water for fire suppression activities.

- Rural Domestic Water

The pipeline would provide the opportunity for rural homeowners to tap into a reliable, safe water supply. Treatment would be required by users.

- Irrigation

There are about 7,377 acres of arable lands in the project service area. Presently, about 1,533 acres are irrigated, but irrigation is frequently curtailed during summer months due to lack of water. About 897 acres of the 1,533 acres require supplemental supplies. The project would allow a full irrigation supply for about 2,601 acres by the pipeline distribution system and 1,163 acres by pumping directly from Elk Creek totaling 3,764 acres. Those lands not receiving sufficient water at this time (approximately 897 acres) would receive a supplemental supply.

- Flood Control

Floods frequently occur in Elk Creek. Approximately $205,000 of average annual flood damage occurs in or near the City of Drain. The project would decrease the flood elevation by about 1 foot in Drain which would reduce flood damages to about 1/3 of present levels.

- Recreation

Two recreation facilities would be constructed on the shores of Milltown Hill Reservoir. These facilities would allow public parking and access to the shoreline and to the lake for sightseers, picnickers, recreational boaters, and fishing. An estimated 53,000 recreational use-days per year are predicted.

- Addition of a Reservoir Fish Program

Several actions would be taken to ensure good habitat for reservoir fish. These actions include leaving timber standing on about 90 acres on the Walker Creek arm of the reservoir and in the northern portion of the reservoir. Timber would also be left standing south of the County Road #8 causeway. Brush piles would be left in the central pool area. In addition, brush piles, tree stumps, and other woody debris would be placed in the main pool area and south of the County Road #8 causeway. Emergent vegetation would be planted in the southern end of the reservoir for habitat enhancement. Although these actions would benefit fisheries resources, shoreline spawners may be adversely affected by drawdowns in the reservoir pool during irrigation season.

Mitigation of Project Impacts

- ### Mitigation of Wildlife Impacts in the Reservoir Area

The project would include several actions taken in the reservoir area to mitigate wildlife and wildlife habitat losses. These actions would include measures for both terrestrial and aquatic wildlife.

The County proposes to acquire and manage approximately 200 acres of land adjacent to the southern end of the reservoir area for terrestrial wildlife mitigation. These lands would be protected and managed to increase wildlife habitat, but would not involve measures which would require intensive operation and maintenance. Improvements would include the cessation of livestock grazing to allow recovery of native plants. The area is currently fenced. Vegetative plantings of mast producing plants would be made along field edges and fence rows to form a buffer, provide cover, and produce food. Snags would be developed in coniferous stands, by providing nest boxes and platforms, to improve nesting habitat for several bird species.

An additional 50 acres of snags and nest box development would occur on lands in the takeline area. This would include wood duck boxes on the Walker Creek arm of the reservoir. Goose nests and osprey platforms would be constructed in several areas.

- ### Mitigation of Loss of Black-tailed Deer and Turkey Habitat

Habitat would be secured off-site to compensate for loss of 680 acres of black-tailed deer and turkey habitat which would be occupied by the reservoir. The County would secure 767 acres of habitat for the Federal endangered Columbian white-tailed deer. The 767 acres would be a portion of the 3,500 acres of white-tailed deer habitat that is necessary to secure to delist the species so that the species can be managed. About 2,000 acres of secured habitat exists within Federal, County, and State lands.

- ### Mitigation of Impacts to Wetlands in the Reservoir Area

Douglas County proposes the development of about 23 acres of permanent, shallow-water wetlands at the upstream end of the reservoir south of the County Road #8 causeway. These wetlands would be formed by scooping out shallow depressions in flat areas that would normally be dewatered during summer drawdown. The excavated material would be used to create low berms adjacent to the shallows. The berms would be treated to protect them from erosion and would be planted with herbaceous and woody vegetation tolerant to inundation. These wetlands would survive projected

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drawdown conditions.

Douglas County would purchase an abandoned 3 acre log storage pond in cooperation with the Oregon Department of Transportation (ODOT). The log pond is located on private land north of Yoncalla in section 28, Township 22 South, Range 5 West. ODOT would use a portion of the land for a maintenance shop. The County would administer the remainder of the grounds and the pond. The County would maintain the pond, the surrounding area, and riparian areas along Yoncalla Creek. Management would involve enhancing the wetland area for wildlife and developing recreation facilities compatible with that use. Parking spaces, a rest area, and trails would be included. The County plans to negotiate management of the wetland area with the Yoncalla Recreation District. If the Recreation District would not want to administer the area, then Douglas County Parks Department would assume management responsibilities.

Wetlands in the irrigation service area would be protected from agricultural development. Douglas County would notify landowners of the location of wetlands. No project drainage or change in agricultural practices would occur to negatively affect jurisdictional wetlands at the time the water service contract is negotiated. This would be enforced by Douglas County with a wetland protective clause in the water service contract between the County and individual water user.

- Mitigation of Impacts to the Transportation System

The existing County roads would be re-aligned and improved near the proposed reservoir. This would result in a safer transportation system in the vicinity and between Interstate-5 and Oakland via County Road #7.

- Mitigation of Impacts to Cultural Resources

A site protection and mitigation plan would be developed and presented to the State Historic Preservation Office (SHPO) and the Advisory Council on Historic Preservation (Council) for review and approval. A Memorandum of Agreement (MOA) for impact mitigation actions would be signed by Reclamation, Douglas County, the SHPO, and the Council. Native American tribes would be consulted regarding treatment of human remains and other objects, consistent with requirements in the Native American Graves Protection and Repatriation Act of 1990. If a standing structure was determined eligible to the Register, means to preserve the structure would be sought. If preservation was not feasible, its historic and/or architectural characteristics would be documented. These actions would also be addressed in the site protection and mitigation plan and the MOA described above.

Affected Environment and Environmental Consequences of the Preferred Alternative

General Vicinity

The proposed Milltown Hill project dam site is located on Elk Creek at river mile 39.4 and is in the SW 1/4 SE 1/4 Section 4, T.23S., R.4W., W.M. Elk Creek originates in the Calapooya Mountains approximately 7 miles southeast of the damsite, and flows westward for approximately 47 miles across northern Douglas County to its confluence with the Umpqua River at Elkton. The Elk Creek subbasin covers 290 square miles.

Climate

Approximately 85 percent of the 48 to 54 inches of precipitation in the Elk Creek subbasin occurs between November and April. Only 15 percent occurs between May and October. Precipitation is primarily in the form of rainfall rather than snowfall because of the relatively low elevation. Summers are warm, frequently approaching 90 to 100°F.

Water Quantity and Quality

The mean annual discharge of Elk Creek at Drain, located 12 miles downstream from the damsite, is 209 cfs. Low flows, frequently reaching 0 cfs, occur typically from June through October, which reflects the lack of precipitation during this period. The high flow record at Drain is 19,000 cfs. Zero flows have been recorded.

Water quality in Elk Creek is generally high. It is within the allowable limits specified in Oregon Drinking Water Standards. Water temperatures in Elk Creek usually reach high levels during the summer months, thereby reducing the habitat of juvenile anadromous fish. Construction of the dam and other project facilities would cause temporary turbidity in Elk Creek. The impacts would be minor and short-lived. Soil erosion control efforts would be required during construction. Waters in the reservoir pool may have increased turbidity, reduced dissolved oxygen, and increase nutrient levels for several years. The fixed cone valve would aerate the water, increasing dissolved oxygen content of discharged reservoir water. However, water temperatures in the reservoir would be significantly lower during the summer months, thereby benefiting aquatic fauna downstream. There is some concern about the potential for natural occurrences of mercury in the proposed reservoir. Mercury levels would be monitored by Douglas County.

Released water would be well aerated and cold providing for enhanced habitat for fish downstream from the dam. The multiple-level intake on the outlet works would allow selection of discharge water at various levels permitting control of turbidity, temperature and dissolved oxygen in Elk Creek below the dam. Irrigation flow returns would return to surface waters mostly through the ground water rather than through surface flows, resulting in low levels of turbidity and low water temperatures, with some increase in dissolved constituents.

Supplies of ground water in the Elk Creek subbasin are limited, and appear adequate to supply only individual rural domestic needs. The cities of Yoncalla and Drain and irrigated farmlands are dependent upon surface water supplies.

Stream flows in Elk Creek during the months of July through October frequently do not meet current water demands. Junior water right holders usually have their withdrawals limited or stopped, while holders of older water rights may have their withdrawals curtailed during the summer months. Future demands for surface water will undoubtedly increase, making water shortages more critical. The 24,143 acre-foot capacity of the proposed reservoir would meet existing and projected irrigation and municipal and industrial needs. Approximately 7,737 acre-feet would be allocated for stream flow enhancement for fisheries resources, 937 acre-feet for municipal and industrial users, and 9,654 acre-feet for irrigation needs.

Communities which would benefit from the project's water are Yoncalla and Drain, having populations of 790 and 1,070 respectively. The small community of Rice Hill, which obtains its water from ground water supplies, would also benefit from availability of a pipeline supply.

Approximately, 4,661 of the 7,377 acres of arable lands in the service area would benefit from the project.

Storage would reduce flood damage in the Drain area to about 1/3 of its present level.

Geology and Soils

Geologic and seismic investigations indicate the project site is suitable for construction of the dam. Soils in the reservoir area are composed of alluvial deposits of silt, sand and gravel. The potential for erosion is moderate. Construction of the project would cause short-term soil erosion in the reservoir inundation area. Erosion control measures would minimize siltation in Elk Creek.

Air Quality and Noise

An on-site quarry, located above the 775 high water level, would be used to provide all rock needs for the project. Construction activities would cause localized, temporary lowering of air quality in the project area. Contractors would be required to comply with applicable federal and state air quality regulations, to keep air quality impacts at minimum levels.

Construction noise would exceed the present ambient low noise levels. Construction noise levels would affect only a few local residents during daylight hours. Motorboats would be the primary sources of noise during project operation. This can be expected at a water storage project.

Visual Quality

Visual quality of the project area (reservoir and dam site) would be altered considerably. The present low-use pastoral setting in upper Elk Creek valley would be changed to a high-use water-oriented recreation area. Reactions of local residents to such change would probably vary, depending upon personal tolerance. The visual quality of the reservoir area would decrease during the drawdown period, as increased barren shorelines became more noticeable. There are no primitive areas, natural areas, or areas of critical environmental concern in or near the project area.

Land Use

The project would require 1,192 acres of land. Approximately 680 acres would be inundated and the remaining 512 acres would be used for other project facilities, such as wildlife habitat areas, recreation sites, new roads and road causeways, realigned roads, a microwave tower, and the quarry.

There are approximately 115 acres of prime farmlands in the reservoir area that would be flooded. No unique farmlands have been identified in either the reservoir area or on the lands suitable for irrigation. Approximately 364 acres of commercial timberlands would be lost to the project.

Approximately 31 acres of wetlands in the reservoir area would be inundated. The project would provide for the development of new wetland areas in the upper reservoir area.

The project would not alter existing land-use patterns in the irrigated areas, however secondary impacts could occur in the watershed, such as modification of timber harvest activities to assure visual quality and water quality of the service area water.

Threatened and Endangered Species

The Fish and Wildlife Service has identified Columbian white-tailed deer, bald eagle, peregrine falcon, and northern spotted owl as listed species that may occur in the area of the proposed project. There are no known federal or state listed threatened or endangered plants in the project area. A survey was made to determine if the threatened northern spotted owl exists on or near the project area. No owls were located in the area 1.2 miles from the damsite. Section 7 Consultation with the Fish and Wildlife Service, as required under the Endangered Species Act, was undertaken for the Columbian white-tailed deer, and bald eagle. No impacts are anticipated to these species. Management actions would increase bald eagle habitat in the reservoir area. Consultation for the Northern spotted owl has been initiated with the Fish and Wildlife Service. A revised biological assessment of all threatened and endangered species has been prepared and submitted to the Fish and Wildlife Service.

Wildlife Resources

The Elk Creek subbasin supports a variety of big-game animals, such as Roosevelt elk , black-tailed deer and black bears. Non-game mammals and furbearers are known to exist in the project area. Population levels are unknown. The project would inundate 680 acres of habitat presently available for wildlife. This loss of habitat would be mitigated by securing suitable habitat for the Columbian white-tailed deer and the black-tailed deer in areas south of the project known to be white-tailed deer habitat. An additional 200 acres of land would be secured immediately south of the reservoir as additional wildlife habitat. The upper reaches of the reservoir would be developed into potholes, creating additional wetlands and wildlife habitat.

The reservoir would provide new habitat for waterfowl and birds of prey, such as the osprey and bald eagle. The reservoir would be stocked with fish, providing a source of food for these birds of prey.

The reservoir would create an influx of recreationists. This increase in people will result in a minor amount of harassment to wildlife.

Recreation

The two recreational facilities on the reservoir would provide up to 50,000 day use visits annually plus some increase in waterfowl hunting.

Fish Resource

The four and a half miles of Elk Creek and tributaries to be flooded by the reservoir is existing habitat for anadromous fish and resident trout. The resident trout would continue to live and spawn in the upper 1 1/2 miles of Elk Creek above the normal full pool at 775 msl. Although the habitat would be lost, it would be more than offset by fisheries enhancement through project improved, colder instream flows in 39.4 miles of Elk Creek below the dam. Additional fish habitat improvement would be provided by depositing gravels and woody debris in selected sections of lower Elk Creek and a few of its tributaries.

Enhancement actions would provide increases of 225 fall chinook, 1,450 winter steelhead, and 1,450 coho. Resident fish populations upstream from the dam and reservoir would not be adversely affected by project operation. The reservoir would be stocked with either warm-water fish or trout.

Cultural Resources

Excavations of 3 known archeological sites and several possible other sites would be accomplished before project construction activities are authorized. Appropriate federal and state agencies would be consulted to determine site significance and to develop site preservation or recovery plans.

Socio-economic Conditions

Approximately 10 households, including 26 residents living in the proposed reservoir area, would require relocation. The resident relocation program would be conducted in accordance with the Uniform Relocation Assistance and Real Properties Acquisition Policies Act of 1970. Douglas County would negotiate property compensations with the residents at the earliest possible date, and provide assistance to those seeking relocation in the area.

The influx of construction workers would not significantly impact police and fire protection services, hospital service, schools, transportation, or housing. Most construction workers are expected to be local workers, presently residing in the County. Imported workers are expected to commute from Roseburg or nearby towns. These cities are capable of providing all the services needed by the construction work force. During the 4-year construction period, on-site contractors and Government employees would generate over $11,000,000 of wages.

Operation of the project would have an increasingly favorable impact on the local socio-economic conditions in the Elk Creek subbasin. The provision of year-long adequate supplies of water would provide the impetus for new and diversified industries in the Elk Creek subbasin. A slow increase in the productivity of farmlands in the service areas would be realized, as lands become irrigated to their potential productivity levels.

The influx of recreationists to the reservoir would generate an undetermined amount of income to the service industry in the county.

Environmental Consequences of the No-Action Alternative

The no action alternative assumes that the Federal government would neither act nor participate in an action to relieve water resource problems in the study area. If any actions were taken in the area, they would be performed by local and State entities, private organizations, and individuals. For the Elk Creek subbasin, the future without a project is identical to a "no-action" alternative. A condition of "future without" is required as a base from which to measure benefits and impacts. Table S-2 compares the impacts of the no-action alternative and the preferred alternative.

The proposed project area and conditions in the Elk Creek subbasin would remain in their present condition if no action was taken. The identified needs of the county and of the residents of the service area would not be realized. In addition, enhancement opportunities for natural resources would not be realized.

The environmental components which would remain unchanged if the project was not constructed are: climate, topography and geology, seismicity, soils, mineral and aggregate resource, air quality, noise, vegetation, wetlands, threatened and endangered species, cultural resources, visual resources, recreation, and wildlife.

A summary comparison of the impacts of a no-action alternative and the preferred alternative is shown in Table S-2. The following discussions focus on the impacts on those environmental components which would be affected if the project was not constructed.

Land Use

The land area proposed to be occupied by the dam and reservoir would continue to be used as it is now. No new irrigation development is possible without surface water storage. Lands presently without sufficient sources of water would continue to suffer from that problem, and the economic potential of the land would not be realized. The agricultural areas in Scotts Valley, Yoncalla Valley, and areas bordering lower Elk Creek would probably continue to be used primarily for livestock production. Such production would continue at present low levels due to the lack of water needed for irrigation. The areas occupied by the towns of Yoncalla, Drain and Elkton would remain the primary urban communities, showing little or no expansion. A small increase in rural homesites would occur.

Public Water Supply

Yoncalla would continue to rely on the diversion of water from Adams Creek. This source is not reliable and is unsatisfactory, since it is stored in a shallow 100 acre-foot reservoir. There would be no water for the expansion of existing industries or introduction of new industries in Drain, Yoncalla, or the Rice Hill area.

Surface Water Quantity

Summer flows in the lower segments of Elk Creek would remain about the same or slightly decrease. Flow decreases would result in water temperature increases and dissolved oxygen decreases. Floods would continue to be an unresolved problem in lower Elk Creek.

Surface Water Quality

Water quality would remain much as it is today. Some minor improvement in suspended sediment and color could result if restrictions on harvesting timber in spotted owl habitat go into effect.

Ground Water

Slight increases in rural home construction in the Elk Creek subbasin can be expected in the future. This would further increase the demand for domestic water, resulting in further depletion of ground water sources in the vicinity of Drain, Yoncalla, and Rice Hill as well as in downstream areas.

Anadromous Fish Habitat

The fisheries resource would remain much as it is today. Actions to improve habitat are not likely. Low summer flows and poor instream habitat would continue to limit resident and anadromous fish populations.

The 4 1/2 mile segment of Elk Creek which would be occupied by the proposed reservoir would remain as habitat for anadromous and resident fish. The lower reaches of Elk Creek and its tributaries would continue to be marginal spawning habitat for anadromous fish, due to low flows and high water temperature during summer.

Population

The displacement of 26+ persons from their homes in the reservoir area would not be necessary. Without new industries, the population of Drain and Yoncalla would grow slightly, but not as rapidly as growth rates for Douglas County or the State of Oregon. A slight increase in rural population can be expected in Elk Creek subbasin, since people who prefer the rural quality of life would build homes there, and commute to Eugene or Roseburg for their livelihood. A small increase in population may occur from in-migration of retirement-age people. This would probably be offset by the out-migration of younger people looking for livelihood in Roseburg or Eugene, or other metropolitan areas.

Economic Growth

Opportunities for economic growth and diversity in the communities of Drain, Yoncalla and Elkton would not be realized, due to the lack of water for irrigation, municipal, and industrial use. These communities would continue to have their economy based on jobs relating to the wood processing industry, which may face further decreases in production in the near and not-so-near future.

These communities would not benefit from income generated by construction and operation of the preferred alternative. The opportunity for increased farm income in the future would not be realized.

Douglas County has placed the Elk Creek subbasin as its first priority among several small water development projects in the County. The County has also indicated that if the preferred alternative cannot be identified as a feasible project then it will place the Milltown Hill storage plan in an inactive status and pursue studies in other tributaries to the Umpqua River. The County would return to the Elk Creek proposal sometime in the future and determine if conditions had changed sufficiently to warrant a renewed attempt to develop the project. Termination of the project would preclude any significant growth or economic stabilization within the Elk Creek subbasin.

The Federal government plans to adopt a recovery plan for the threatened Northern spotted owl. This action would probably result in a significant decrease in future timber harvests. Large, old-growth forests, characteristic of Douglas County, would be particularly affected. The anticipated, yet to be determined, reduction in timber harvest would cause a further decline in the

Table S-2. Summary Comparison of the Impacts of a No-action Alternative and the Preferred Alternative.

	No Action Alternative	Preferred Alternative
Climate	No impact	No impact
Geology, Topography	No impact	Site appears geologically suitable. Minor local topographic changes would result from construction of the dam, recreation sites, and relocated and new roads.
Seismicity	No impact	No impact on dam up to design acceleration. Minimal risk of induced seismicity from the reservoir.
Soils, Erosion	No impact	680 acres of soils would be inundated by the reservoir and dam. Small amounts of soil will be lost in the construction of recreation sites and realigned roads.
Mineral and Aggregate Resources	No impact	Borrow areas would be within the pool area. No threat to future mercury mining. Oil and gas development unlikely.
Air Quality	No impact	Construction activities would cause decreased air quality due to dispersion of particulates and to equipment exhausts.
Noise	No impact	Increased noise during 3-year construction period. Increased noise levels on reservoir and shorelines during recreation season.
Vegetation	No impact	680 acres of vegetation would be permanently lost due to the reservoir and dam, including pasture land, timber, brush, riparian, and wetlands. An additional 6 acres would be lost due to road construction and relocation.
Wetlands	No impact.	The loss of wetlands in the reservoir area would be mitigated by purchasing and enhancing wetlands near Yoncalla and by developing additional wetlands in the upper pool area of the reservoir.
Threatened and Endangered Species	No impact.	No adverse effects to federally listed species would occur. Beneficial effects to the bald eagle would occur as a result of increased forage base. Mitigation for game species would benefit endangered Columbian white-tailed deer by securing 767 acres of habitat.
Cultural Resources	No impact	Identified sites would be excavated to determine significance. Recovery plans would be developed.
Visual Resources	No impact	Increased quality in lower reaches of Elk Creek. Increased quality at full or near-full reservoir. Decreased quality as water level decreases.
Recreation	No impact.	Up to 50,000 water-oriented recreation days would become available each year.
Wildlife	No impact.	A variety of non-game and game species would be affected by loss of 680 acres of habitat by reservoir inundation and 50 acres above the take line. Lost habitat values would be mitigated by creating a 235 acre wildlife area on-site and by securing 767 acres of Columbian white-tailed deer habitat off-site. The reservoir would provide new aquatic habitat for certain wildlife such as waterfowl, bald eagle, and osprey. Riparian habitat would be restored downstream.

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Table S-2. continued.

Land Use	Agricultural areas would continue to produce livestock feed at less than optimum levels.	Increased irrigation would result in increased livestock production. Slight decrease in land suited for timber production. Loss of agricultural lands in the reservoir area. Economic Growth Opportunities for growth would continue to be extremely limited.
Public water supply	Yoncalla would continue to divert and store water from Adams Creek, but growth would be limited because of water supply. Water quality would remain unsatisfactory. Rice Hill ground water supplies would diminish.	M&I water demands would be adequately met, increasing the possibility for increased economic growth in Yoncalla, Drain, and Rice Hill. A new reliable source of water would be available in the Rice Hill area and Yoncalla.
Surface Water	Summer flows in lower segments of Elk Creek would remain about the same or slightly decrease. Temperatures would increase slightly due to decreased stream flow. Dissolved oxygen would decrease. Stream turbidity would remain unchanged.	Summer flows would increase. Winter flows would decrease, preventing some flooding. Stream temperature would be reduced in summer in 20-30 miles of stream below the dam. Stream turbidity would increase slightly in summer and decrease slightly in winter. Dissolved oxygen would increase in summer. Increased amounts of water would be available for M&I and irrigation use, and stream habitat improvement.
Ground Water	Supplies would gradually decrease due to increased use as a domestic water source.	Water table near the reservoir and in irrigated areas would be higher.
Fish Habitat	No change in existing poor anadromous fish habitat.	The reservoir would provide a new fishery, but also cause the loss of 4.5 miles of anadromous and resident fish habitat. Anadromous fish habitat would be enhanced by increased summer flows, decreased water temperatures, gravel dispersement, and improvement of pool-riffle ratio in lower Elk Creek.
Population	Slight natural increase in population. Younger residents would move to areas of better work opportunity. Some increase in rural residential growth.	Opportunities for increased agricultural work and diversification of industries would result in net increases in population.
Economic Growth	Opportunities for economic growth would not be realized. Future reliance on the wood processing industry remains uncertain.	The availability of water would present opportunities for increased production of crops, provide adequate supplies of water for increased municipal use and industrial diversification.
Flooding	Portion of Lower Elk Creek would continue to experience uncontrolled flooding during periods of high winter runoff.	Overbank stages of Elk Creek in the city of Drain would be reduced one foot.

forest products industry, resulting in an outmigration of people and high unemployment. Such a situation would reduce County revenue, increase costs for assistance programs, increase social problems, and intensify the need for economic diversity and stabilization.

A decrease in County revenues would make developing an infrastructure to attract new business more difficult. Since 1980, Douglas County has invested over $19 million of federal Oregon and California (O&C) timberland revenues in water resource projects. The future availability of O&C revenues for water resource development may be in jeopardy, as these funds could be diverted to provide for other social needs resulting from anticipated high unemployment. If the currently conceived project is not authorized, the existing problems would not only continue but may worsen as a result of the mandated reductions in harvesting federal timber.

The community of Rice Hill can absorb only a limited amount of additional growth, and only if private wells are developed. Ground water in the Rice Hill area is difficult to find in quantities sufficient for domestic needs. Water quality would continue to be a problem.

The city of Yoncalla is currently limiting expansion of its water system. While the city could possibly enlarge its current 100-acre-foot off-stream reservoir and increase the capacity of its Adams Creek pumping plant and pipeline, Adams Creek flows are too uncertain to significantly help the community.

The City of Drain has a water right to store 1,000 acre-feet of water on Billy Creek. A 290 acre-foot reservoir was constructed. Engineering conditions make enlarging the current reservoir unlikely. This situation would limit future growth in Drain.

Some rural domestic growth may occur elsewhere in the subbasin using local ground-water supplies. However, land use restrictions would limit this type of growth.

Flooding

Periodic flooding of Elk Creek would continue in the future. The Umpqua Basin would continue to suffer an average of $205,000 in flood damages annually.

CONSULTATION AND COORDINATION

On November 26, 1985, the Douglas County Commission and the Bureau of Reclamation signed a Memorandum of Understanding (MOU), initiating the Northern Douglas County Cooperative Water Resources Study. The study involved the search for potential water storage sites in the Calapooya and Elk Creek subbasins. The MOU defined each agency's role in the study. Subsequently, the study was limited to the Elk Creek subbasin. A study plan was formulated, and a multi-disciplinary team was organized. The team members were assigned one or more environmental or engineering components of the study. Reclamation mailed a notice of initiation of the study to the media, federal and state agencies, and groups with known interest in Reclamation's activities. As the study progressed, it became apparent to Reclamation and Douglas County that the Milltown Hill alternative merited increased study.

From 1985 through 1991, more agencies became involved in the study. The National Environmental Policy Act (NEPA) requires the preparation of an environmental impact statement whenever a federal or federally-related project is proposed which may significantly affect the environment. NEPA further requires that concerned federal, state and local agencies, and the public be consulted in the preparation of the environmental impact statement, in order to determine if the project will cause controversy or areas of concern.

The agencies with which the Bureau of Reclamation and Douglas County most closely coordinated included:

- Douglas County Water Advisory Board
- Douglas County Parks Department
- Oregon Department of Fish and Wildlife
- U.S. Fish and Wildlife Service
- National Marine Fisheries Service
- Corps of Engineers
- Bureau of Mines
- Soil Conservation Service
- Bureau of Land Management

The citizens of Douglas County, especially those in the Elk Creek subbasin, have actively expressed their needs through public meetings.

Table 4-1 in Section 4, Consultation and Coordination, summarizes environmental concerns and actions taken to address concerns for the proposed project. During consultation and coordination, no areas of controversy surfaced. However, as data were gathered, and significant studies progressed, the following issues were raised and were subsequently addressed in the development of the project plans reflected in this environmental impact statement.

- Areas to be served by the project

- Specific needs of water in the Elk Creek subbasin for municipal/industrial and irrigation users.
- Water yield to satisfy the needs
- Water quality
- Loss of anadromous fish and their habitat
- Loss of wildlife habitat
- Loss of habitat of threatened and endangered wildlife and flora
- Loss of prime and unique farmlands
- Loss of wetlands
- Loss of sources of minerals and aggregate
- Loss of farmlands to be flooded by the project
- Loss of timber-producing lands
- Displacement of people living in the proposed reservoir area
- Flood Control
- Project safety
- Project alternatives
- Transportation impacts
- Recreation opportunities

1.0 PURPOSE AND NEED

1.1 Purpose

The purpose of the Milltown Hill Project, a 24,143 acre-foot reservoir and pipeline distribution system 18.5 miles long in the Elk Creek subbasin (Umpqua River Basin) of western Oregon (Figure S-1), is to fulfill a portion of the existing and projected needs of urban and rural water users. The project would:

- Provide increased water supplies during the growing season through an irrigation system, to provide irrigation water for up to 2,601 acres of arable land in Yoncalla and Scott's Valley, and allow pumping of water directly from Elk Creek to irrigate up to an additional 1,163 acres of arable lands along Elk Creek. A supplemental supply would be provided to 897 acres.

- Provide for the storage and distribution of water to the cities of Yoncalla and Drain and the community of Rice Hill, allowing for municipal expansion and industrial diversification.

- Provide a reliable source of water for rural domestic use in the areas served by the pipeline system.

- Provide opportunities to improve fish and wildlife habitat.

- Improve water quality in Elk Creek and Yoncalla Creek.

- Provide new water-related recreational facilities.

- Provide limited flood control, in and near the city of Drain.

1.2 Need

Coordinated water-related studies by the Bureau of Reclamation and Douglas County have been intermittent in Douglas County since the 1950's. Recent studies, along with consultation with other agencies and the public, focused on current socio-economic and biological conditions in the Elk Creek subbasin. The studies identified the problems within the subbasin, how these problems evolved, and what might be done to solve them.

The primary socio-economic problem in the subbasin stems from the lack of opportunities for industrial growth and diversification. This problem has been on-going for decades. The area has historically been dependent on the forest products industry which produces 70% of the County's resource. The private timber base supplying the resource for the industry has been almost completely depleted after forty to fifty years of harvesting. Changes in wood processing techniques, competition for government-owned timber, high stumpage prices, high processing costs, and unpredictable markets have forced most processing plants in the area out of business. The future of this industry remains uncertain, especially since region-wide controversy has developed over the future management of old-growth forests and the protection of the Northern spotted owl, a federally designated threatened species.

The tourist industry, an important economic factor in Douglas County, is not a viable income producing alternative in the project area. There are no destination resorts to attract tourists and water-related recreational opportunities are not available in Elk Creek subbasin. There are no federal or state parks.

The economy of the area is not likely to improve unless opportunities become available for industrial diversification. The Milltown Hill Project presents this opportunity. A major factor in economic diversity is the availability of water. The cooperative studies have found that the area suffers from the lack of year-round supplies of quality water for municipal, industrial and irrigation use. Lack of water has inhibited economic growth in the subbasin. Construction and operation of the Milltown Hill project would provide the optimum amounts of water for municipal growth, industrial diversification, and improved agricultural development. The project would also permit the development of improved anadromous fish habitat, water-related recreational activities, and some flood control. As a result of the findings of these studies, Douglas County applied to the Bureau of Reclamation for a loan under the Small Reclamation Projects Act (P.L. 84-984) to construct and operate the Milltown Hill Project. This action was taken in May, 1991.

A more detailed discussion of area needs follows:

1.2.1 Socio-economic

The problems of seasonal and cyclical unemployment in the Elk Creek subbasin are related to the vagaries of the wood products industry. The decrease in available private timber in the past decade has increased the demand for federal timber. This in turn has created inordinately high prices for timber. Bidders actively bid on timber which may be hauled more than 100 miles to be processed. Local processing plants have not been able to meet the competition. This has resulted in mill closures and the loss of jobs.

The tourism industry in the Elk Creek subbasin is not considered a major job-producing industry since there are no major recreational facilities in the area. Many local residents have moved to Roseburg or Eugene to find employment. Other residents have remained in the area, either commuting to these cities or attempting to find temporary local employment. Unemployment rates remain high. This results in increased social problems with which the County must control. At the same time the demands for local government increase, tax receipts and other county revenues are reduced, thereby limiting government's ability to provide the needed services.

1.2.2 Anadromous Fish

Elk Creek offers little habitat diversity for the production of fish and other aquatic organisms due to the lack of gravels, riffles, and other instream structures. Spawning and rearing habitat for anadromous and resident fish is sparse, especially during low flows. Late summer flows are generally less than 5 cfs and frequently approach 0 cfs, whereas average winter and spring flows are about 800 to 1,000 cfs. The low summer flows and warm climate combine to create warm water temperatures that frequently exceed 75 °F in the mainstem.

Stream temperatures throughout Elk Creek subbasin regularly exceed the maximum temperature of 58 °F for protecting the eggs an young of cold water fish (such as trout and salmon). The 65 to 70 °F maximum that cold water fish can withstand for short periods is also regularly exceeded. Measurements in Elk Creek near Elkton show periodic temperatures near 80 °F. The stream needs reduced temperatures to support the spawning and rearing of cold water fish.

Specific areas of need identified within Elk Creek include improved instream habitat, improved riparian habitat, increased instream flows, and lower water temperature.

Elk Creek consists of a bedrock system with many long pools and few riffles. Most of these pools occur in the lower part of the creek below Drain. They are generally shallow and less than 3 feet in depth. These pools provide the primary fish rearing potential in Elk Creek, but they contain little if any cover such as boulders and woody debris required by young fish. Enhancing the pools for rearing would require placement of additional materials to provide cover.

Spawning habitat requires gravel. The mainstem of Elk Creek lacks significant gravel sources. Some gravel deposits occur along the stream banks and in the small tributary streams. In order to enhance mainstem spawning, measures are needed to trap gravel and disperse it across the bottom of the stream. The stream would also require additional placement of gravel to supplement natural recruitment.

Elk Creek has good riparian habitat and canopy in the upper 1/2 of its length. Several areas between Scotts Valley and Boswell Springs and in Putnam Valley have sparse riparian vegetation. The areas of sparse riparian vegetation appear to have resulted from land use practices, primarily grazing. Insufficient riparian vegetation causes bank erosion, increases stream temperatures, removes a source of biomass to the stream, reduces cover for the fish, and may reduce summer base flow. Those areas with poor riparian vegetation need a combination of plantings and other measures to protect the riparian vegetation. Between 1.5 and 2.0 miles of stream require riparian restoration. Below Drain, Elk Creek widens and riparian canopy is minimal to the mouth.

Streamflows become very low in the summer months, particularly in July, August, and September. Irrigation diversions further reduce these flows. Periods of no streamflow are common. Since low flows occur during the hottest months of the year, water temperatures become elevated. These conditions eliminate rearing habitat. Elk Creek needs an increase in instream flows during summer months to maintain rearing habitat.

In 1974, the State established a right for minimum flows on Elk Creek to help protect instream flows. Annually, these minimum statutory flows are violated 44 percent of the time. In 15 of the 28 years, at least 1 day of zero flow was recorded. There were 33 days of no-flow in 1973.

1.2.3 Wildlife Habitat

Wildlife habitat in the Elk Creek subbasin has been altered by logging, agriculture, grazing, and residential development. Land use in Shoestring Valley above Walker Creek has caused changes from forest successional stages to grass-pasture. Wildlife habitat needs would involve planting wildlife food plots in pastures and developing snags for cavity nesting species. A continued effort is needed to enhance wildlife habitat.

1.2.4 Ground Water Quality

Information supplied by a study (Geological Survey, 1977) indicates that ground water quality in the Elk Creek subbasin, particularly in the Putnam, Scotts, and Yoncalla Valleys, is not suitable for municipal, industrial, or agricultural uses. This is due to seasonal high nutrient and coliform levels, apparently coming from non-point sources. There is a need to reduce nutrient input to ground water.

1.2.5 Ground Water Availability

Studies by the Geological Survey in 1977 indicate that the ground-water resources in the project area are limited and variable. Yields from existing wells range from about one to a few gallons per minute. The study concludes "because of the low permeability and low yield of the aquifers, there is little potential for large irrigation or municipal ground-water development in the Drain - Yoncalla - Rice Hill area. Additional municipal - irrigation water will have to come from new surface storage" (Bureau of Reclamation, 1991). There is a need for surface supplies to augment ground water supplies.

1.2.6 Surface Water Quality

In general, the surface water quality in Elk Creek subbasin is good. Total dissolved solids run well below the recommended maximum for municipal use of 500 milligrams per liter (mg/l). Most constituents examined in standard tests such as calcium, sodium, potassium, carbonate, sulfate, and chloride also are acceptable.

Some county water supplies do not meet use-criteria at various times and places. In particular, water samples taken at several locations in the subbasin exhibit problems with color, turbidity, temperature, fecal coliforms, dissolved oxygen, and various trace metals. Both aquatic life and esthetics are threatened in the lower 27 miles of Elk Creek because of pH and nutrient levels (Department of Environmental Quality, 1990). Contact recreation and aquatic life uses in this reach are not supported because of fecal coliforms and dissolved oxygen levels as well as low summer flows. The report states that suspected causes are agriculture (return flows), municipal point sources (sewage effluent), and nonpoint sources (septic tanks and drain field systems). The implication is that the problem is a seasonal one that occurs during low summer flows. There is a need to determine the causes of dissolved oxygen and fecal coliform problems.

The Department of Environmental Quality (DEQ) cited effluent from the Cities of Drain and Yoncalla as possible causes of high coliform and nutrient levels in Elk Creek in its 1988, 305b report. In response to a mandate from DEQ, some cities in Douglas County are being required to enter into long-term contracts with the County to purchase storage water to augment river flows for improving effluent assimilation. Douglas County has published augmentation requirements to rectify flow deficiencies from May through October in the Elk Creek subbasin.

Elk Creek has high turbidity and color levels. Color affects the stream's esthetic appeal while turbidity can increase treatment costs and limit municipal and industrial use. Turbidity can be caused by streambank erosion, stream bottom erosion, and land management practices. High turbidity and color levels are greatest during high runoff months and are most likely associated with deciduous leaf fall and streambank erosion. Elk Creek subbasin needs better land management to help reduce sediment transport, color, and turbidity levels.

The principal problem with water temperature is the effect it has on cold water fish, such as salmon and steelhead. Salmon eggs are extremely sensitive to temperature. Eggs are harmed when temperatures exceed 56 °F. Mortality begins at 57.5 °F. Young fish are able to tolerate temperatures as high as 65 to 70 °F for short periods of time. Stream temperatures measured in Elk Creek near river miles 42.2 and 25 indicate that temperatures at these sites regularly exceed these temperatures. Spot measurements in Elk Creek near Elkton show periodic temperatures exceeding 80 °F. Data indicates that the timing of critical temperatures in Elk Creek occur as noted below:

- Near Elkhead ------ June through early September.
- Near Drain ------ late May through early October.
- Near Elkton ------ May through October.

Elk Creek needs lower water temperatures during these critical times. Low flows and sparse riparian canopy in certain stream reaches contribute to the temperature problem. High temperatures, in turn, contribute to dissolved oxygen problems. The stream needs 1.5 to 2.0 miles of improved riparian vegetation and augmented summer flows to help reduce temperature.

Water samples taken near river mile 42.2 (approximately 2.8 miles upstream from the damsite and 0.5 miles downstream from the abandoned Elkhead mercury mines) indicate elevated concentrations of cadmium, chromium, copper, lead, mercury, and zinc. However, these concentrations are within Federal and State water quality standards for safe drinking water.

The Elkhead mercury mine operated near the proposed reservoir. A survey of the abandoned mercury mine, tailings, and water sources in and near the mine indicates potential contamination. The potential for contamination from the Elkhead Mercury Mine site needs to be monitored.

1.2.7 Municipal Water

The Cities of Drain and Yoncalla have attempted to augment their water supplies by constructing small storage reservoirs to help meet municipal demands during the dry summer months. The city of Drain has constructed a 290-acre foot reservoir on Billy Creek, which serves the City of Drain. Yoncalla has as offstream, 100-acre foot storage reservoir, which is filled by pumping water from Adams Creek. The reservoir helps meet peak summer demands. The subbasin has no other significant water storage facilities.

The two communities have surface water rights for municipal water. The City of Drain has a 1909 priority right for 2 cfs and a 1912 priority right for an additional 2 cfs from Bear Creek (a tributary of Billy Creek). It also has a 1971 storage right for 1,000 acre-feet on Billy Creek. These rights are adequate to meet present needs, however the flow yields on Bear Creek are not adequate, and the existing reservoir on Billy Creek cannot meet the municipal demands of the future.

Yoncalla has a 1923 priority right for 1.5 cfs from West Fork Wilson Creek, Wilson Creek, and Adams Creek, and a 1940 priority right for 0.23 cfs from Adams Creek. It also has a 1979 storage right for 111.5 acre-feet. The existing 100-acre foot reservoir is located offstream in the Yoncalla Valley. The reservoir is filled by pumping water from Adams Creek. The water rights appear to be adequate, but the opportunity to develop them is limited. Adams Creek has recorded zero flows at times which makes the supplies unreliable. Yoncalla's reservoir is shallow, suffering from algae growth and high temperatures, which adversely affects the water's palatability.

There is a need to develop a source of water for Drain, Rice Hill and Yoncalla which is both reliable and adequate for present and future demands. Based on population projections, the cities of Drain, Rice Hill and Yoncalla will need an additional 1,405 acre-feet of water to meet the needs through the year 2030.

1.2.8 Rural Domestic Water

Rural Domestic Water is classified as water obtained from individual sources, not from any water vending entity. Most often, ground water is obtained from private wells. Occasionally, a larger well or series of wells benefit a group of residents.

Surface water sources are not generally diverted for rural domestic use because of the cost of potable treatment. The rural population growth in Elk Creek subbasin has recently outpaced the growth in the two cities. This indicates a trend for the need of a central water supply to serve rural domestic needs in the future. The County has estimated rural demand will increase from 822 acre-feet in 1980 to 1,164 acre-feet in 2030.

1.2.9 Industrial Water

Industrial water use from Elk Creek is limited to two rights for log storage ponds, totaling 1.02 cfs. Future industrial use in the Elk Creek subbasin is expected to be limited to sand and gravel operations. This use would require about 25 acre-feet per month from May through October for a total of 150 acre-feet annually.

At the present time, there does not appear to be a reliable source of water available for industry. Costs associated with the treatment of municipal water are prohibitive for most industrial applications. A new source of water is needed to provide industrial opportunities and diversification of the economy.

1.2.10 Irrigation

The hilly topography in the Elk Creek subbasin supports lush unirrigated pasture part of the year, which contributes to the predominance of sheep and livestock production. However, little land is suitable for the production of crops that require annual tillage. Orchards and some specialty crops such as wine grapes have been produced in the past, but distance to markets and processing costs are excessive for the volume produced. Local production has not been adequate to attract processing facilities or markets.

Agricultural areas in the subbasin receive approximately 40 inches of rain per year, but it is concentrated in the months of October through April. The area experiences very dry conditions July through September, resulting in low streamflows, thereby restricting the water available to irrigate crops at critical growth periods. There is no irrigation storage facility to provide water during these dry summer months. As many as 7,377 acres of potentially irrigable land has been identified in the subbasin. Irrigation of this land could help the County achieve its goal to diversify and strengthen the local economy. The maximum legal water duty in Douglas County is 2.5 acre-feet per acre per year. This indicates that the subbasin needs 18,450 acre-feet per year to develop its land base. Irrigating less than 7,377 acres of land or using less than 2.5 acre-feet of water per acre would reduce the annual water need for irrigation. Development of this land could also require development of drains to avoid high water table problems.

Because the State established minimum flow requirements on Elk Creek in 1974, water rights established after that time do not receive a full supply in most years. Further, commercial agriculture is not protected in times of drought or extreme low flow, and many pre-1974 rights are also turned off early in many years.

The District 15 Watermaster has indicated that water rights established before 1950 generally have a full supply of water each year. Priority rights established between 1950 and 1974 normally begin to be curtailed around the end of July in most years. Diversions with priorities after 1974 are normally cut off about July 1. Applying this schedule to existing irrigated acreage, between 350 and 680 acres receive a full supply; about 740 acres get water until July 31; and 73 acres receive water until June 30 in most years.

Junior water right holders on Elk Creek frequently lose their water supply in the latter part of the summer. These junior rights need a supplementary supply in order to fully utilize the land's potential. The current uncertain water supply has prevented farmers from optimizing the productivity of their lands and has prevented the County from realizing the full economic potential of its land resources.

Approximately 897 acres of land need supplemental water service. The average annual water needed to fully supply these lands is 1 acre-foot per acre, or an average annual water need of 897 acre-feet.

1.2.11 Outdoor Recreation

Current outdoor recreation opportunities in the Elk Creek subbasin are relatively few. There are no destination resorts in the area, due to the lack of large County, State or Federal recreation areas, and the lack of water-oriented recreation facilities. Most of the land is privately owned. This precludes the development of any large scale public outdoor recreation activities.

The development of a large water-oriented facility in the subbasin would partially fill the current void of recreation opportunities, thereby attracting local and regional visitors. Increased recreational opportunities would result in increasing the area's share of the County's tourist industry. There is a need for water-oriented recreation facility.

1.2.12 Flood Control

Elk Creek has no flood control structures. High streamflows damage both urban and rural property. Property damage from flooding tends to be concentrated in the City of Drain where industrial, commercial, public, and residential developments are located on the Elk Creek and Pass Creek flood plains.

Pass Creek enters Elk Creek within the boundaries of the City of Drain. During high flow periods, backflows from Elk Creek enter the lower reaches of Pass Creek and exacerbate flood damages near their confluence. Damages to agricultural lands and woodlots occur in the rural areas both upstream and downstream of Drain. Bridges in Drain and in the outlying areas are subject to damage from high floodflows. The largest flood of record, estimated to be greater than a 50-year recurrence interval flood, occurred on February 10, 1961, when a maximum instantaneous flow of 19,000 cfs was recorded on Elk Creek downstream of its confluence with Yoncalla Creek. Studies performed by the County and the Corps of Engineers estimated flood damages that are anticipated with each size flood. The results of these studies indicate the average annual flood damage in the subbasin approximates $205,000 (U.S. Army Corps of Engineers, 1988).

Flood control in Elk Creek would require keeping flood flows in channel and out of flood plains, or by developing an upstream storage facility capable of storing water during periods of peak runoff.

1.2.13 Wetlands

Wetlands habitat in the potentially irrigable areas have been greatly degraded by land practices. Historically, there were agricultural lands which contained high value seasonal wetlands. Much of this land has lost its wetland characteristics due to farming and draining operations. However, some lands still meet the definition of jurisdictional wetlands by soil, hydrologic, and vegetation criteria. These lands are scattered through Scotts and Yoncalla Valleys and along Elk Creek and its tributaries. These remaining wetlands need protection. Measures should be taken to enhance wetlands where possible.

1.3 Summary

Problems in the Elk Creek subbasin relate to lack of adequate flows. This is graphically shown in Figure 1-1. Historic flows are low; demands exceeded availability during summer months in 1980 and the trend of increased demand will continue. The estimated shortage of water under current conditions is 6,271 acre-feet. The estimated shortage of water will continue to increase and by year 2030 will be 27,000 acre-feet. The shortage has the following effects:

- Whenever water users cannot receive the amount of water they need, land productivity suffers, local economy is weakened, and water users are less likely to make investments that would enhance the economic value of their land.

- Fishery resources suffer when users deplete Elk Creek of water to the point that fish rearing areas dry up or become stagnant. The long-term effect of this is decreased commercial and sport fishing in the ocean and in the Umpqua River Basin.

- The current depleted state of Elk Creek during the peak demand period in the summer diminishes economic development in the subbasin. Since an alternative ground-water resource is not available for economic growth, the lack of a surface water resource means that growth is not possible.

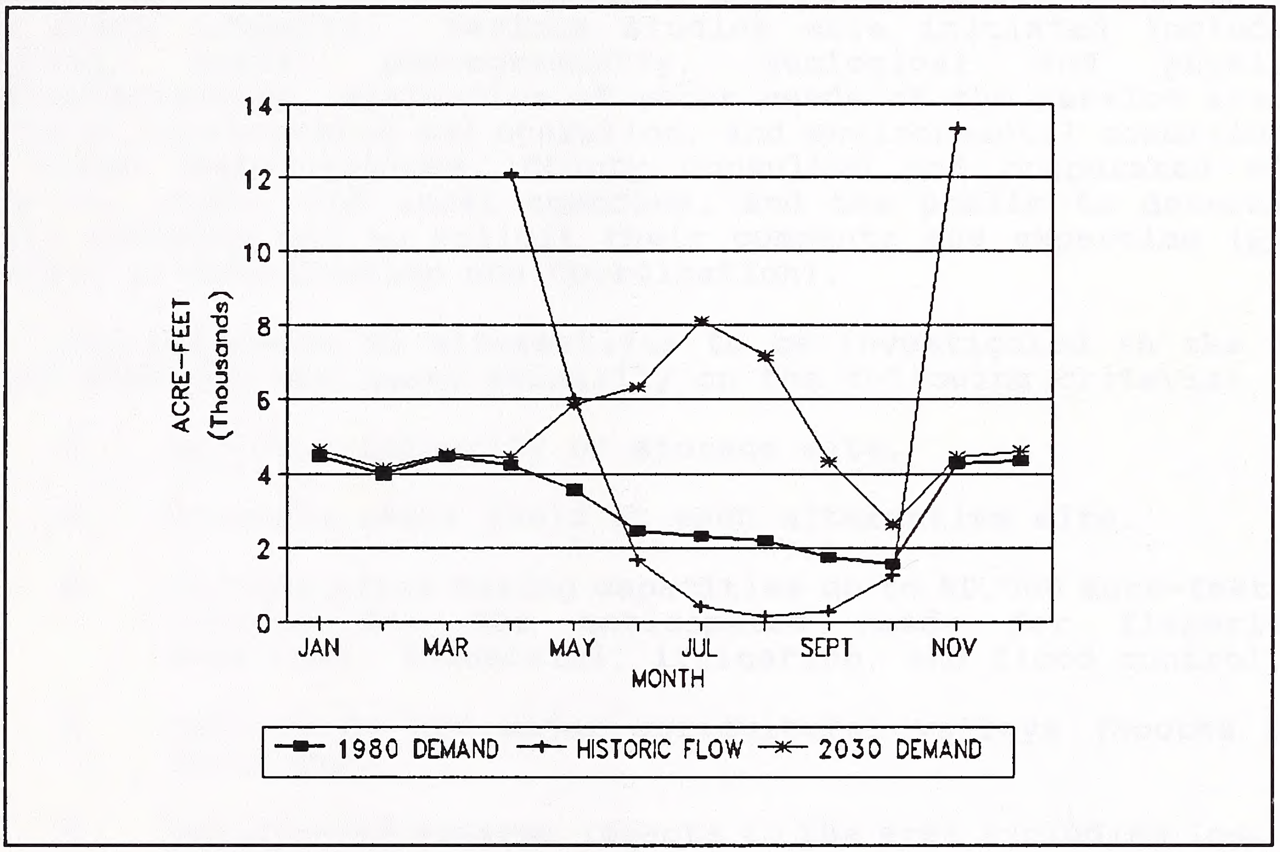


Figure 1-1. Comparison of Historic Flow with 1980 and 2030 Demands on Elk Creek (Bureau of Reclamation, 1991).

2.0 ALTERNATIVES

2.1 Alternative Selection Process

In 1956, Douglas County (County) began investigations of possible alternatives for providing an adequate water supply for the needs in Elk Creek subbasin (Bureau of Reclamation, 1956). The long period of investigation and study reflects the difficulty of finding solutions to meet existing and future water needs in the Elk Creek subbasin. Various studies were initiated including mapping, aerial photogrammetry, geological and physical characterization, evaluation of water needs of the service areas, costs of construction and operation, and environmental conditions. In these investigations, County consulted and cooperated with federal, state, and local agencies, and the public to determine their concerns and to solicit their comments and expertise (See: Section 4, Consultation and Coordination).

The selection of alternatives to be investigated in the Elk Creek subbasin was based primarily on the following criteria:

- Geologic integrity of storage site.
- Adequate water yield at each alternative site.
- Storage sites having capacities up to 50,000 acre-feet to provide for the anticipated needs for fisheries, municipal, industrial, irrigation, and flood control.
- Service to two major agricultural valleys (Scotts and Yoncalla).
- Anticipated adverse impacts to the area including loss or decrease of service area, cost of relocation of highways and utilities, unavoidable loss of natural resources, and changes in land use.
- Municipal and industrial water needs of the cities of Drain and Yoncalla.
- Acceptability to the public.
- Capability of providing new water-based recreational activities.
- Cost effectiveness (financially feasible to the County).
- Site must be high in the watershed, to lessen, as much as possible, the impacts on the spawning habitat of anadromous fish.

The alternative selection process evolved over a 35-year period. The process considered sites of varying storage capacities for structural alternatives. The structural alternatives consisted of storage sites for construction of a dam, reservoir, and appurtenant facilities. Other alternatives considered were interbasin transfers of water and pumping from ground water sources. Non-structural alternatives considered were water conservation and retirement of irrigation land.

Using the above criteria, and after collection of necessary data and performing studies to determine the physical conditions of all alternatives, the preferred alternative was selected, because:

- Estimated water yield above the damsite is adequate for present and future needs.
- The site would have a storage capacity of 24,143 acre-feet, capable of providing the present and anticipated needs for fisheries habitat enhancement, municipal and industrial water, rural domestic water, and irrigation water. It would also provide some flood control.
- The site would provide irrigation capabilities to 4,661 acres of agricultural lands in Scotts Valley and Yoncalla Valley, and lands adjacent to the lower reaches of Elk Creek.
- The site is geologically acceptable.
- The site would provide adequate year-long water for municipal and industrial use in the cities of Yoncalla and Drain and in the community of Rice Hill, and numerous rural residences.
- The site is overwhelmingly acceptable to the public.
- The site is high in the watershed and would eliminate only 4 1/2 miles of anadromous fish habitat. Fish habitat would be enhanced on 39 miles of stream below the reservoir.
- The site would result in minimal adverse impacts to existing land use, transportation systems, and rural residents. However the site would result in the loss of 260 acres of grass pasture land, 364 acres of commercial forest land, and 680 acres of wildlife habitat. The latter would be mitigated.
- Construction and operation of the site would be cost-effective.

- The 680 acre reservoir would provide new opportunities for flat-water recreation of boating, and fishing, and waterfowl hunting.
- The reservoir and adjacent areas would provide new habitat for eagles and osprey.
- Operation of the project would provide opportunities for industrial diversification and urban growth.
- The project would improve water quality, and alleviate adverse water quality conditions caused by waste discharges in the Elk Creek subbasin.
- Arable lands which meet wetlands criteria would be excluded from the project service area.

The preferred alternative would meet all of the municipal and industrial water needs through the year 2030, and perhaps beyond. Instream habitat for anadromous fish would be enhanced between the dam and the mouth of Elk Creek and in the lower reaches of Yoncalla Creek and Adams Creek. The irrigation component would meet all of the supplemental irrigation needs. It would not necessarily provide enough water to develop all arable lands, but would meet needs of those showing interest through owner surveys. The preferred alternative would provide a reduction in the flood level in the city of Drain.

Under the Bureau of Reclamation Small Reclamation Projects Act of 1956 (SRPA) and the Douglas County Water Resources Management Program (Douglas County, 1989), the County has determined that the Preferred Alternative is financially feasible. The municipal and industrial and flood control proposals are cost efficient. The fishery proposal would be cost efficient since the project would result in decreasing downstream temperatures within the biological needs for anadromous fish rearing in Elk Creek.

Mitigation of project impacts on wildlife is achievable. A mitigation proposal has been developed in cooperation with the Fish and Wildlife Service, National Marine Fisheries Service, and Oregon Department of Fish and Wildlife. The proposal contains elements to mitigate or avoid wetland habitat losses which is a national priority. One mitigation element includes securing habitat for the endangered Columbian white-tailed deer. Under Federal formulation criteria (which would require only minimum basic facilities), the proposed recreation developments would not be cost-effective. However, the level of recreation development desired by the county makes the increment financially feasible (Bureau of Reclamation, 1991).

The preferred alternative has received acceptance at the local level. Local demand for such a project has been voiced since about 1955 (See: Section 1.0, Purpose and Need). Those who would be most immediately affected, residents of the area that would be inundated, support the project. The environmental community has been notified of the project. No opposition has been identified. State and Federal fish and wildlife agencies have been involved in formulating the project. Those agencies have not expressed adverse reactions.

Basic elements of the preferred alternative have received public review through the Douglas County Comprehensive Plan development process (Douglas County Planning Department, 1989). The preferred alternative meets the objectives of the Comprehensive Plan, since it would partially fulfill the County's economic development goal. The alternative is also compatible with existing State and local laws and regulations.

2.2 Preferred Alternative

2.2.1 Purpose

A project at the Milltown Hill Dam site (Figures S-1 and 2-1) would serve portions of Elk Creek subbasin downstream from the site. It would, primarily, provide water for anadromous fish, municipal, industrial, rural domestic, and irrigation uses. Secondary benefits would include resident fish and wildlife habitat enhancement, flood control, new recreational opportunities, and water quality enhancement.

2.2.2 Description

2.2.2.1 Dam

The project would consist of a 24,143 acre-foot reservoir at river mile 39.4 on Elk Creek (See: Appendix A for drawings of the dam). A 179 foot-high dam (hydraulic height) would inundate 680 acres of land at the 775 foot mean sea level (msl) elevation at normal (full) pool. The reservoir would impound about 4 1/2 miles of Elk Creek and 2 miles of tributaries (Table 2-1 and Figure 2-2). Excavation for construction of the dam would require removal of approximately 300,000 cubic yards of overburden and rock. The material would be backhauled and used for the fill required for the relocation of Scotts Valley road at the south end of the reservoir and for development of the recreation areas (Bureau of Reclamation, 1991).

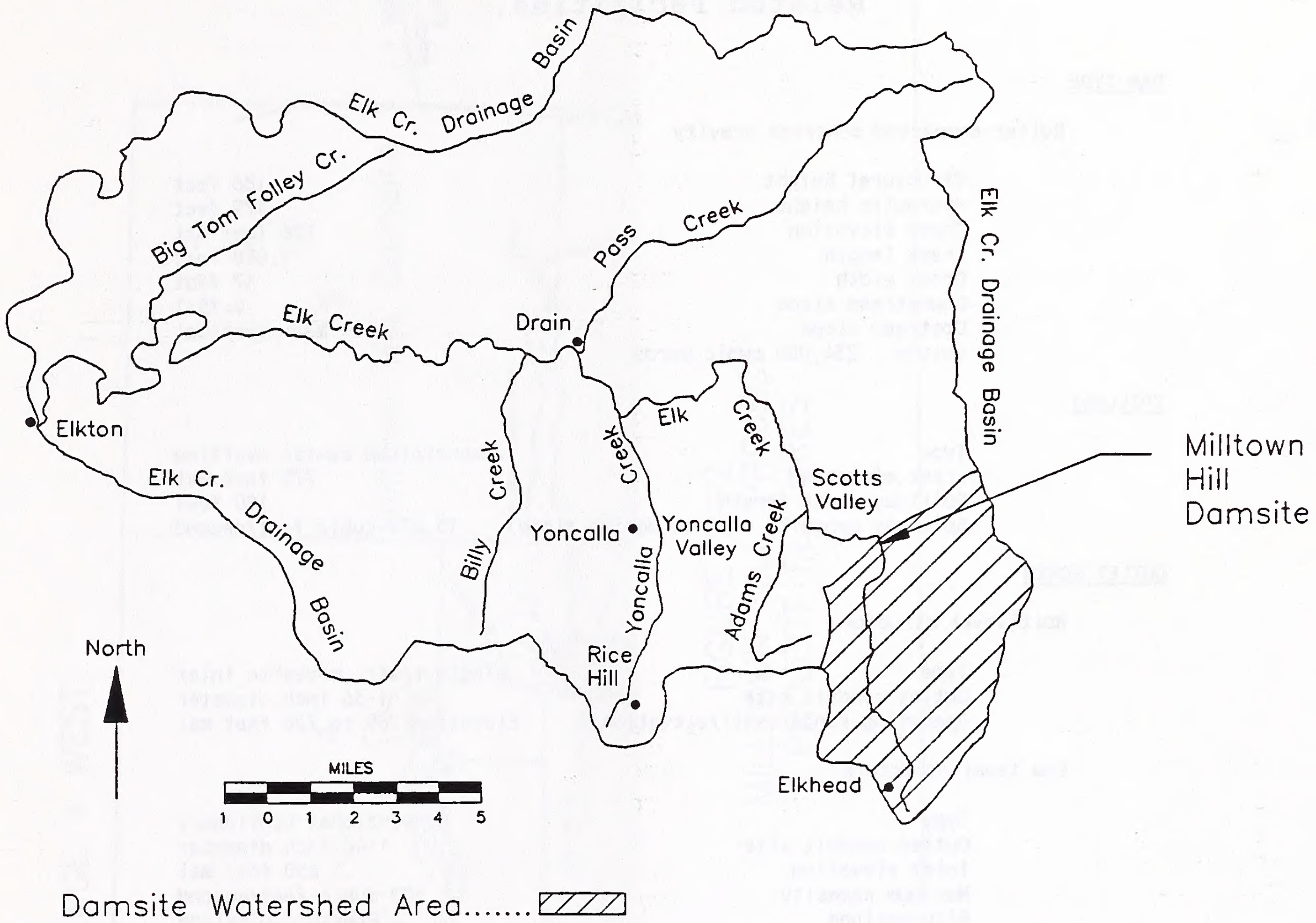


Figure 2-1
Milltown Hill Project
Milltown Hill Watershed

Table 2-1. Description of Milltown Dam and Related Facilities.

DAM TYPE

Roller-compacted concrete gravity

Structural height	186 feet
Hydraulic height	179 feet
Crest elevation	786 feet msl
Crest length	1,050 feet
Crest width	17 feet
Downstream slope	0.75:1
Upstream slope	Near Vertical
Volume	234,000 cubic yards

SPILLWAY

Type	uncontrolled center overflow
Crest elevation	775 feet msl
Spillway crest length	100 feet
Spillway capacity (inflow design flood)	15,235 cubic feet/second

OUTLET WORKS

Multilevel structure

Type	Single tower, moveable inlet
Outlet conduit size	1-36 inch diameter
Operating range (sill/elevation)	Elevation 765 to 720 feet msl

Low level structure

Type	Conventional-stationary
Outlet conduit size	1-48 inch diameter
Inlet elevation	650 feet msl
Maximum capacity	600 cubic feet/second
Bifurcations	Pressure pipeline Hydroelectric stub
Valves	1 fixed cone outlet valve 4 butterfly control valve

DIVERSION WORKS

Type	Temporary-to be plugged after construction
Conduit size	5-foot diameter
Maximum capacity	400 cubic feet/second with cofferdam

STORAGE

Total capacity	24,143 acre-feet
Dead (107 ac-ft) and inactive capacity (393 ac-ft)	500 acre-feet
Municipal and industrial	937 acre-feet
Irrigation	9,654 acre-feet
Flow for anadromous fish and temperature control	7,737 acre-feet
Carryover	5,315 acre-feet
Reservoir length normal (full) pool	4.5 miles
Shoreline (normal pool)	13.2 miles

Source: Bureau of Reclamation, 1991.

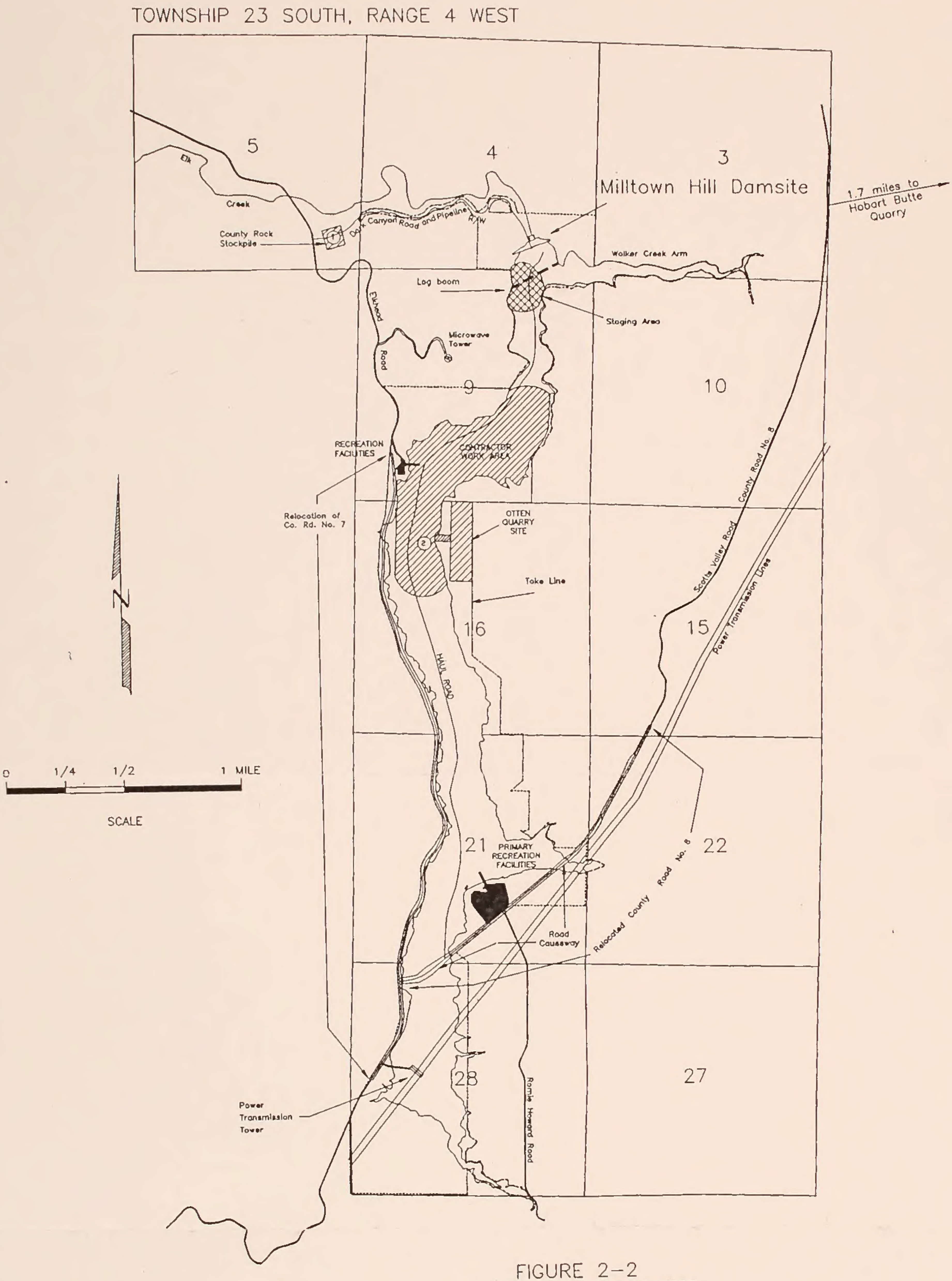


FIGURE 2-2
MILLTOWN HILL PROJECT
PROJECT FEATURES

2.2.2.2 Storage Allocations

The reservoir would have a total storage capacity of 24,143 acre-feet, allocated among its principal uses. The active storage allocation would be made as follows: anadromous fisheries and water temperature control: 7,737 acre-feet; municipal and industrial: 937 acre-feet; and irrigation: 9,654 acre-feet; (Bureau of Reclamation, 1991). About 107 acre-feet of the 500 acre-feet of dead and inactive storage is not accessible since it is below the sill of the low level intake at 650 feet (msl). The 5,315 acre feet of carryover could allow filling of the reservoir during the following year depending on water year. Based on an area capacity curve (See: Appendix A), area and storage at normal full pool, average drawdown, and maximum drawdown are as follows:

POOL	Elevation	Surface Area	Storage
Normal Full pool	775 feet msl	680 acres	24,143 acre-feet
Average drawdown (annual)	736 feet msl	256 acres	6,193 acre-feet
Maximum drawdown (drought)	688 feet msl	22 acres	543 acre-feet

The instream flows necessary to protect aquatic life would be met by the releases of municipal and industrial and irrigation water, by flow that cannot be stored during the winter and spring months when natural run-off exceeds storage capacity, or by storage specifically allocated to fisheries enhancement. Releases to protect aquatic life would come from the 7,737 acre-feet for flow augmentation and water temperature control to enhance the anadromous fisheries resource (See: Section 3.1.15).

2.2.2.3 Intake Structure

The intake structure for the low level outlet would consist of a rectangular shaft with a horizontal sill at elevation 650 (See: Appendix A). A trashrack would be mounted above the sill. A square bellmouth would be provided at the entrance, on the face of the dam. A bulkhead gate would be provided for dewatering. The sill would be located at elevation 650 to provide adequate protection for the inlet. The intake would be high enough to provide protection from siltation for up to 100 years.

The variable depth intake would operate between sill elevation 765 and elevation 720. The inlet structure would consist of a reinforced concrete and steel sleeve, fixed to the lower portion of the dam, and an upper steel pipe section capable of sliding vertically in the sleeve. The inlet, which is fixed to the upper steelpipe, would consist of a converging "funnel" drop type intake having a trashrack above. Due to trashrack and inlet submergence requirements, the inlet sill would operate through a range that is at least 10 feet below these elevations. In the fully raised position (sill elevation 765), approximately 5 feet of pipe would remain in the lower sleeve. A bulkhead gate would not be provided for the water quality intake, since the inlet can be raised out of the reservoir during medium and low reservoir periods (Bureau of Reclamation, 1991).

2.2.2.4 Outlet Works

The outlet works would consist of 2 structures as described above. One structure would have a variable depth port between 765 and 720 feet msl. The second would have a fixed low level outlet at 650 feet msl. Stored water would be withdrawn from different zones (between 650 and 760) in the reservoir to optimize fisheries enhancement (flows and water temperatures). This configuration would allow blending of flows between the 2 structures to achieve water temperature control, although irrigation, municipal and industrial water supply, and flood control do not require temperature control. All releases would be suitable for aquatic life. (Bureau of Reclamation, 1991).

Oregon State law (Oregon Revised Statutes - ORS 540.350) requires that provisions be made on all new water storage projects for future hydroelectric development. In response to this requirement, a 42-inch diameter stub-off pipe and shutoff valve would be located at the downstream toe of the dam, near the outlet works stilling basin. With the present design, future construction of a small powerplant could be accomplished without major modifications to the project.

2.2.2.5 Water Distribution System

Lands that are included in the project service area would meet 3 criteria:

- They are classified as irrigable according to the Bureau of Reclamation criteria.
- Douglas County requires that the lands had to be serviceable from either a gravity pressure pipeline or directly serviceable from Elk Creek.
- In order to be serviceable from Elk Creek, the land needs to be within 1 mile of Elk Creek and require no more than 150 feet of pump lift.

The project would release most of the stored water through a gravity pressure pipeline to the Yoncalla and Scotts Valleys areas for irrigation, municipal, industrial, rural domestic, and anadromous fish uses. The cost of all needed water treatment facilities would be borne by the users. Irrigation water would be supplied seasonally while all other water would be supplied year round. Water would be supplied to users in lower Elk Creek by pumping directly from Elk Creek. Figure 2-3 shows the location of the proposed pipeline system. The pipeline diameter at the head of the system would be 30 inches. Pipe diameter would decrease to 6 inches in service areas near the end of the system. All water delivery points from the pipeline would be metered (Bureau of Reclamation, 1991).

Water taken directly from Elk Creek by irrigators would be pumped through 2 to 8 inch pipelines and be distributed to sprinkler systems.

2.2.2.6 Drainage System

Irrigation return flows are anticipated to be 19 percent of delivered water volume (Douglas County Water Resources Survey, 1991). A fund would be established to provide on-farm drainage, if needed.

Installation of the drainage system for irrigation return flows would be a future project feature as indicated by ground water levels. It would be funded as needed from the County through sale of irrigation water (Myers, 1991).

An irrigation return flow system (sub-surface drainage system) would involve networks of 6 inch perforated tubing placed in a dendritic pattern in each irrigated field, to allow for the collection of soil moisture excess to crop root needs. The pipe would be buried in a trench 2 feet wide and up to six feet deep. If drainage is supplied to all irrigated lands in the service area, then up to 15.6 acres of land could be disturbed. Areas which may require sub-surface drainage systems are shown below:

Area	Acres	Feet of Pipe per Acre	Total Pipe Length (feet)	Width of Trench (feet)	Acres Disturbed
Yoncalla Valley	748	264	197,472	2	9.1
Upper Elk Creek	248	194	48,112	2	2.2
Scotts Valley	428	185	79,180	2	3.6
Lower Elk Creek	145	102	14,790	2	0.7
Totals	1,569		339,554		15.6

Source: Myers, 1991

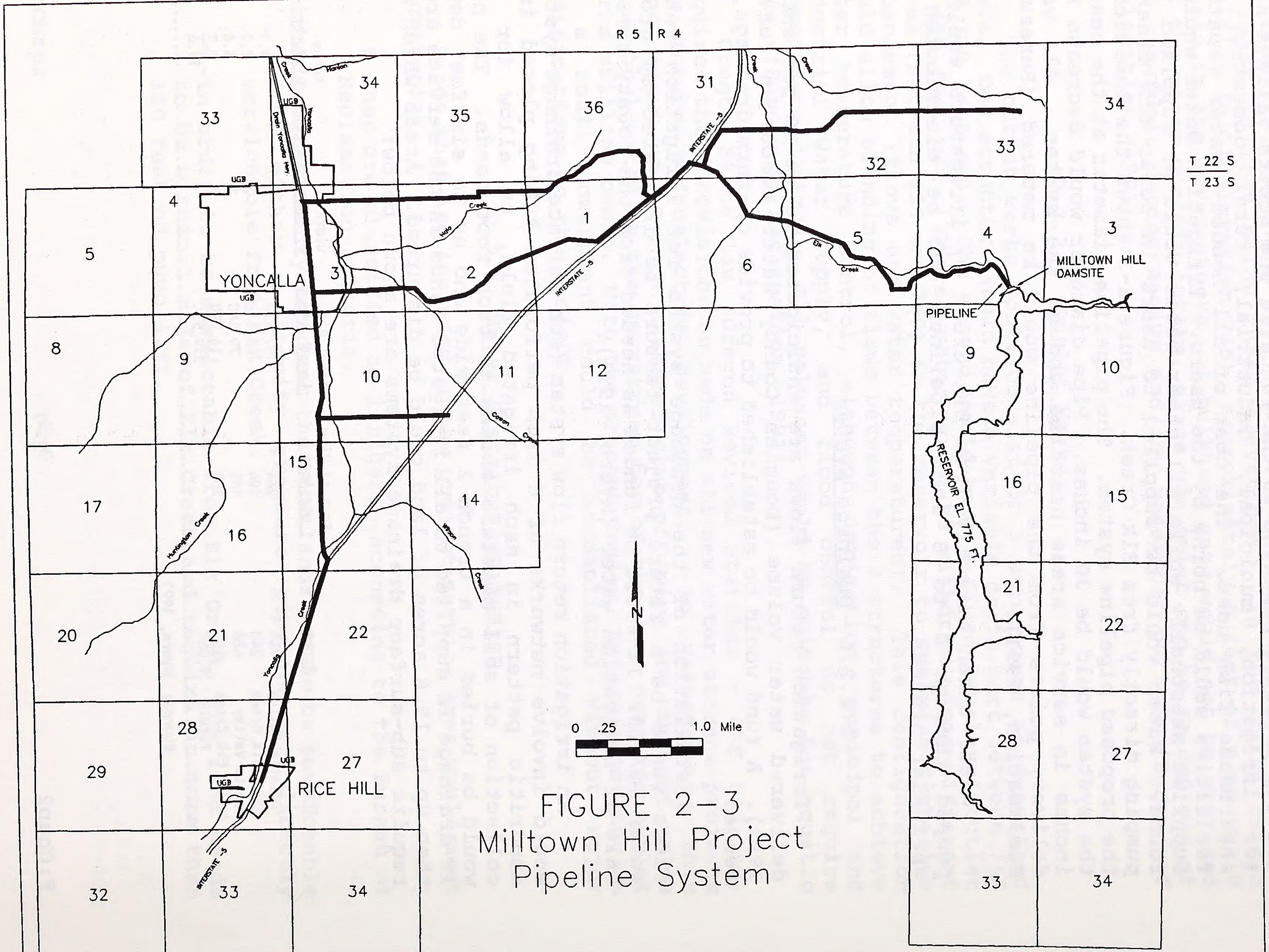


FIGURE 2-3
Milltown Hill Project
Pipeline System

The perforated pipe would be surrounded by a gravel envelope. The trench would be backfilled and excess soil windrowed along the route of the trench. Spacing of the pipe would depend upon the hydraulic conductivity of the particular field. Drain outlets would be placed to discharge water into existing surface waterways whenever possible. If the drainage pattern for a field prohibits the above, an outlet conduit would be located at the lower end of the drain field and extended to the nearest natural drainage for discharge.

Irrigation uphill from a particular field could cause sub-surface water to move into the root zone of a lower field. An interceptor drain would be provided in these instances. It would consist of the same type of perforated tube in a sub-surface gravel envelope at a depth suitable to intercept the water and transport it to an outlet to an existing surface water channel. These conditions could occur in the easterly draws of Scotts Valley and along Elk Creek in tributary valleys.

Typical outlet works would range from a horizontal pipe protruding from the bank of an intermittent waterway, to small concrete or rip-rap head- and wing-walls enclosing the horizontal pipe outlet to a "major" creek channel.

Some lands not now irrigated would require grading of portions of a field to prevent intermittent surface ponding and aggravation of root-zone excess moisture conditions. Such surface drainage improvements would consist of filling depressions and constructing of broad, shallow v-shaped waterways such that normal agricultural equipment operation would not be disrupted, to transport water off a field to an existing drainage channel. The gradients of these waterways would be designed well below rates that would produce erosion under all flow conditions. Sod could be placed in the waterways, as a further erosion reduction aid.

No project drainage or change in agricultural practices would occur to negatively affect jurisdictional wetlands. This would be enforced by County with a wetland protective clause in the water service contract between the County and individual water user. This would be discussed with the water user at the time the water service contract is negotiated.

2.2.2.7 Roads

The reservoir would inundate about 5 miles of Elkhead road and Scotts Valley road. A new service road would be constructed into the base of the damsite (Figure 2-2). About 3 miles of Elkhead Road (County Road #7) which traverses the western rim of the reservoir, would be affected. This road, which carries about 300 cars per day, extends about 15 miles from the I-5 intersection at milepost 154 to a junction at the Driver Valley Road near the city of Oakland. The road would be relocated at approximately 785 feet msl, less than 1/8 mile west of the present location. Elkhead Road would provide access to a recreation area on the northwest side of the reservoir.

The reservoir would also affect the Scotts Valley Road (County Road #8). This road begins at a junction with the Elkhead Road near Interstate 5 and swings to the east and then to the south where it again joins the Elkhead Road near the south end of the proposed reservoir (Figure 2-2). This road, which carries about 100 cars per day, has about 4 miles of paved surface and 5 miles of all-weather gravel surface. The south end of the Scotts Valley Road would be re-aligned to join the existing Elkhead Road. A causeway would connect the east and west sides of the reservoir.

A 1-mile maintenance road would be constructed from the present Elkhead Road (near the present site of the county rock stockpile) to the downstream side of the dam. The road surface would consist of crushed rock on a 14-foot wide right-of-way. This road right-of-way would also serve as the right-of-way for the 30-inch pipeline and a powerline right-of-way to the dam.

2.2.2.8 Utilities

Construction of the dam and the reservoir would require relocating four utilities and installation of a new powerline. Sprint long distance telephone lines (fiber optic), Douglas Electric Cooperative power lines, and Pacific Power and Light Company's three main power lines would be affected.

Telephone lines are currently buried within County Road rights-of-way. These lines would be moved at the utility's costs when the road is relocated. Douglas County notified Sprint of the proposed dam and reservoir at Milltown Hill when it installed its long-distance line, and the company agreed to move the line at its own expense should the dam be constructed.

Douglas Electric Cooperative currently has its powerline along County Road #7 right-of-way on the west side of the reservoir. The utility would place a new powerline down the west side of the reservoir along the new road right-of-way.

Pacific Power and Light Company has one 115 kilovolt and two 230 kilovolt lines crossing the southern end of the reservoir. One 230 kilovolt line will be replaced in 1992 by a 500 kilovolt line. The County would construct an island which would act as a base for transmission towers in the south end of the reservoir area (Figure 2-2). Steel transmission towers would be built on each side of the reservoir to support the lines as they span the reservoir. This arrangement would allow sufficient clearance above the reservoir for safety purposes. The material for the island would be taken from an upland area west of the proposed island.

A new 3-phase powerline would be required to provide power to the control structure at the dam. The powerline would be built in the road right-of-way for Dark Canyon Road (Figure 2-2). The line would be about 1 mile long.

2.2.2.9 Microwave Tower

A microwave tower would be sited on Milltown hill in the NW1/4 NE1/4, Section 9. T.23S.,R.4W. (Figure 2-2). The structure would be a 60 feet high self-supporting tower at an elevation of 1139 feet msl. Electronic equipment would be located in a building about 10 X 15 feet and 8 feet high. Site power would be provided by a spur from the existing 115 KV line which parallels County road 7. The microwave tower would allow project monitoring and control from Roseburg, and also improve FAA and local law enforcement agency communications systems (Motorola Microwave Field Engineering, 1990).

2.2.2.10 Recreation Facilities

Two recreation areas would be constructed at the reservoir site (Figures 2-2 and 2-4). These recreation areas would be designed for day use only. The primary recreation area would be located on the southeast side of the reservoir near the location of the realigned County Road 8. Overburden from the dam site would be placed and shaped on the site to improve it. The site would be landscaped for appearance and utility purposes. This site would include parking facilities for 133 single vehicles or 53 single vehicles and 40 vehicles with trailers. The site would have 28 picnic sites that include 1 or 2 tables and 1 firebox each. The picnic area would also include 1 garbage can and 1 fountain with hose bib for every 4 sites. The site would include a 32-foot by 84-foot pavilion with restrooms in one end. A restroom would be located near the boat ramp. The boat ramp would be 55 feet wide, constructed of concrete, and would have a trolley type launching dock (Horn, 1990).

A site on the northwest side of the reservoir, would include parking, a boat ramp, a picnic area, and sanitation facilities. Parking facilities would have space for 52 single vehicles or 29 vehicles with trailers and 4 single vehicles. The boat ramp, a 50-foot-wide concrete feature with a trolley type launching dock, would be extended to provide access during periods of extreme drawdown. The picnic area would consist of 7 sites with 1 garbage can and 1 fountain with hose bib for every 4 sites. Each picnic site would have 1 or 2 tables and 1 firebox. Sanitation facilities would consist of pit toilets. This recreation site would be considered the secondary recreation area although it would provide the most direct access from I-5, and would be more useable as annual drawdown progresses.

Both sites would be furnished with underground electrical power and handicapped access (Horn, 1990).

2.2.2.11 Other Facilities

2.2.2.11.1 Quarry

The County would use the on-site Otten Quarry, (Figure 2-2), in Section 16, T.23S.,R.4W. This site is about 15 acres and extends from elevation 800 to 1,100 msl, with most of the area between 900 and 1,000 msl. It is about 200 horizontal feet from the 775 foot level of the pool. About 300,000 cubic yards of rock would be extracted and moved to the contractor work area for processing into various sizes necessary for incorporation into the roller-compacted concrete (RCC) mix for construction of the dam. Although about 98% of the sand necessary will be produced from crushing activities on-site, it will be necessary to transport about 2% from existing commercial mining operations. The Hobart Butte Quarry is an optional source of rock. It is located on Bureau of Land Management land about 1.7 miles east of County Road #8 (Figure 2-2). If the Hobart Butte site is selected, Douglas County in consultation with the Bureau of Land Management would prepare a mine development plan and address impacts for NEPA compliance.

2.2.2.11.2 Contractor Work Area

A contractor work area would be required for various activities (Figure 2-2). The work area would be used for processing the rock to a final aggregate for the processing plant. Aggregate would be stockpiled in the contractor's work area or in the staging area. The rock would be crushed to sizes desired and washed, if required, to remove fines. The washing process would include 2 or 3 ponds placed in series to allow the fines to settle. The size of the ponds would be from 1/4 to 1 acre in size. Periodic releases of less than 1/2 cfs of water would be necessary for exchange water. Prior to discharge, from the second or third pond, wash water would be filtered through straw bales, or similar filter material, to remove suspended material. Other purposes of the contractor work area would be for storage of materials, location of field offices, and parking of vehicles and construction equipment.

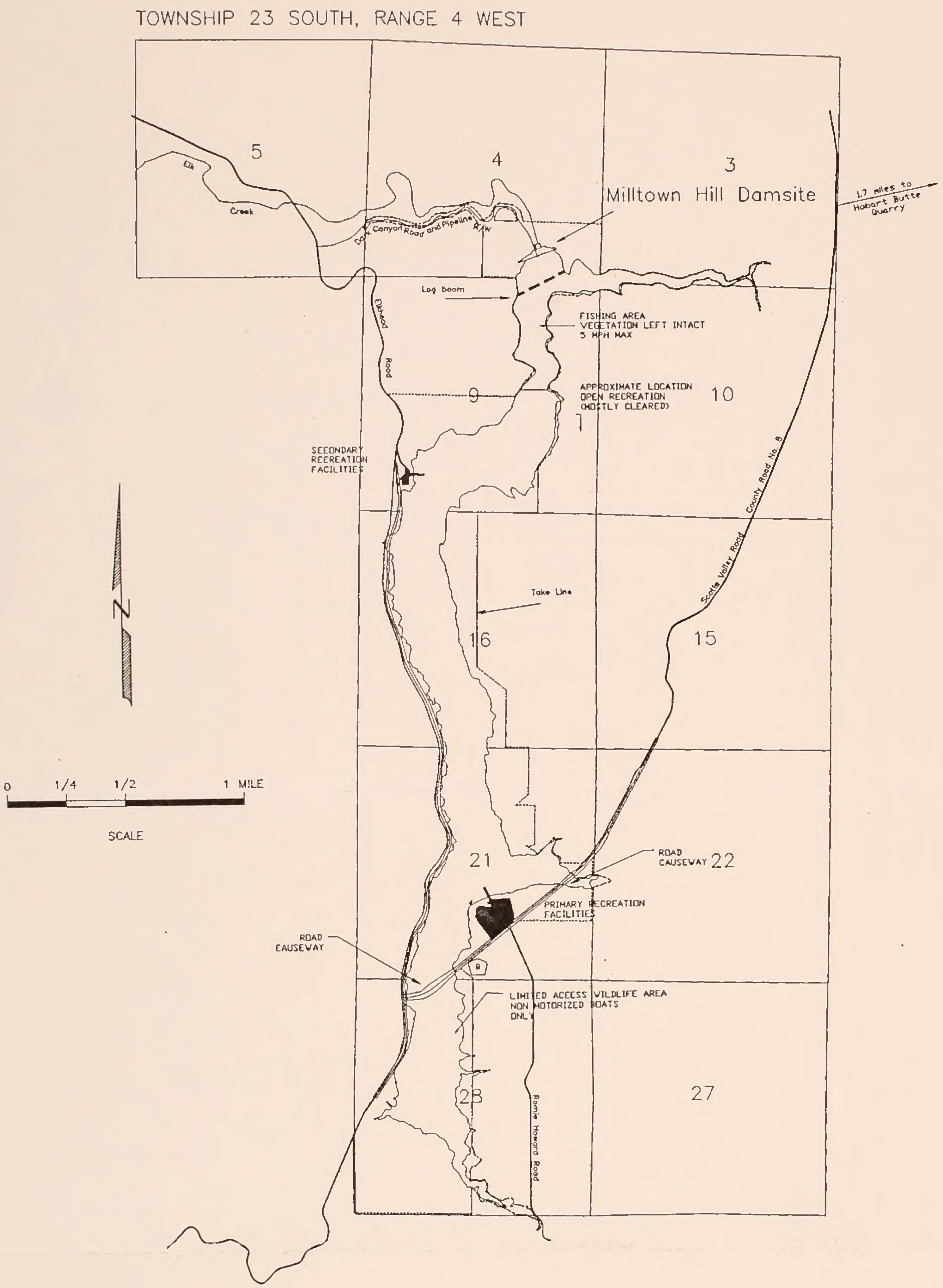


FIGURE 2-4
Milltown Hill Project
Recreation Facilities

2.2.2.11.3 Staging Area

The contractor would develop a staging area for project activities (Figure 2-2). The primary facility would be the RCC batch plant. Aggregate for use in the batch plant would be stockpiled in the staging area or in the contractors work area, depending on the contractor's operation. The RCC mix would be prepared at the staging area and delivered by conveyor or truck to the dam.

2.2.2.11.4 Construction Haul Road

A haul road would be constructed to move overburden materials from the dam site to the southern end of the reservoir for the purposes of reshaping the primary recreation site on the south end of the reservoir (Figure 2-2). It would also be used to move construction materials to and from the dam site and other construction areas. The road would consist of a graded, stabilized and maintained haul road located mainly on the east side of Elk Creek for most of the length of the reservoir pool. It would be located between 300 and 1,300 feet from Elk Creek except for 3 crossings.

2.2.2.11.5 Elk Creek Road Crossings

Three road crossings on Elk Creek would be required along the construction haul road. The exact location has not been defined and would depend on the configuration of the contractors work area. They would be constructed by placing a rock fill across the creek. Temporary culverts would be placed to allow passage of summer flows. The culverts would be removed during high flow winter months.

2.2.2.11.6 Recreation Area

The construction of the dam would require removal of approximately 100,000 yards of overburden materials, consisting mainly of soils, from the dam abutments. These soils would be hauled via the construction haul road to the south end of the reservoir where they would be used to form and contour the primary recreation area (Figure 2-4). Overburden materials from the Otten Quarry, about 50,000 cubic yards, would be used at the recreation site and to level the contractors work area.

2.2.2.11.7 Causeways for County Road #8

The main causeway for County Road #8 would be about 1,300 feet long (Figure 2-2). It would require about 150,000 cubic yards of material composed of earth and rock fill. The material would come from the excess rock and earth extracted for the road excavation for re-alignment of County Road #7. Two culverts, each 8 feet in diameter, would be installed.

The causeway across the Lane Creek area on the southeast side of the reservoir would be about 300 feet long. It would require about 25,000 cubic yards of material composed of earth and rock fill from the excess available from the County Road. A 7-foot culvert would be installed.

2.2.2.11.8 Transmission Line Island

The island and its access road would be constructed from excess material from the road as described above (Figure 2-2). About 20,000 cubic yards of material would be required for the access road and 55,000 cubic yards would be required for the island. The island would occupy 3 acres at the base. It would have side slopes of 4 to 1 and extend from elevation 760 msl to elevation 781 msl. The top of the island would be flattened to provide the base for the transmission towers. The top would be about 0.75 acres (100 X 325 feet).

2.2.2.12 Land Acquisition

The maximum surface area of the reservoir would be 680 acres, however the project would require 1,192 acres within the project take-line (Figure 2-2) as follows:

Land Use	Acres
Flood easement	221
Wildlife mitigation	235
Roads	6
Wetlands	23
Recreation	27
Reservoir	680
TOTAL	1,192

The project area would affect a total of 31 properties of which the Bureau of Land Management controls 3 and Douglas County owns 5. Douglas County would acquire all or part of the remaining 23 parcels except where management covenants may suffice. Acquiring the properties would involve 8 to 10 dwellings which would be handled in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 and amendments. Property required for the take-line is greater than that which would be inundated for the following reasons:

- Additional area at 780 feet msl is required to handle flood events that could inundate lands above the spillway crest elevation of 775 feet msl.
- Federal policy requires that sufficient land above the high water line be taken for operation and maintenance of the project.
- County policy requires a public land buffer around a government owned facility to control access.
- Some blocks of land bordering the reservoir would be acquired for recreation purposes and for wildlife mitigation.
- Relocation of Elkhead Road (County road #7) and Scotts Valley Road (County road #8).
- Construction of the Dark Canyon Service Road to the damsite.
- Construction and operation of a microwave facility.

2.2.2.13 Mitigation of Impacts to Biological Resources

"Mitigation" refers to those efforts taken to lessen the adverse impacts caused by construction and/or operation of the project.

2.2.2.13.1 Reservoir Area Wildlife Habitat

The project would include several actions taken in the reservoir area to mitigate wildlife losses (Figure 2-5). These actions would include measures for both terrestrial and aquatic wildlife.

The project would include acquisition and management of approximately 235 acres of land adjacent to the southern end of the reservoir area for terrestrial wildlife mitigation. These lands would be protected and managed to increase wildlife habitat, but would not involve measures which would require intensive operation and maintenance. Improvements would include the cessation of livestock grazing to allow recovery of native plants. The area is currently fenced. Vegetative plantings of mast producing plants would be made along field edges and fence rows to form a buffer, provide cover, and produce food. Snags would be developed in coniferous stands, and nest boxes and platforms would be provided to improve nesting habitat for several bird species.

An additional 50 acres of snags and nest box development would occur on lands in the takeline area. This would include wood duck boxes on the Walker Creek arm of the reservoir. Goose nests and osprey platforms would be constructed in several areas.

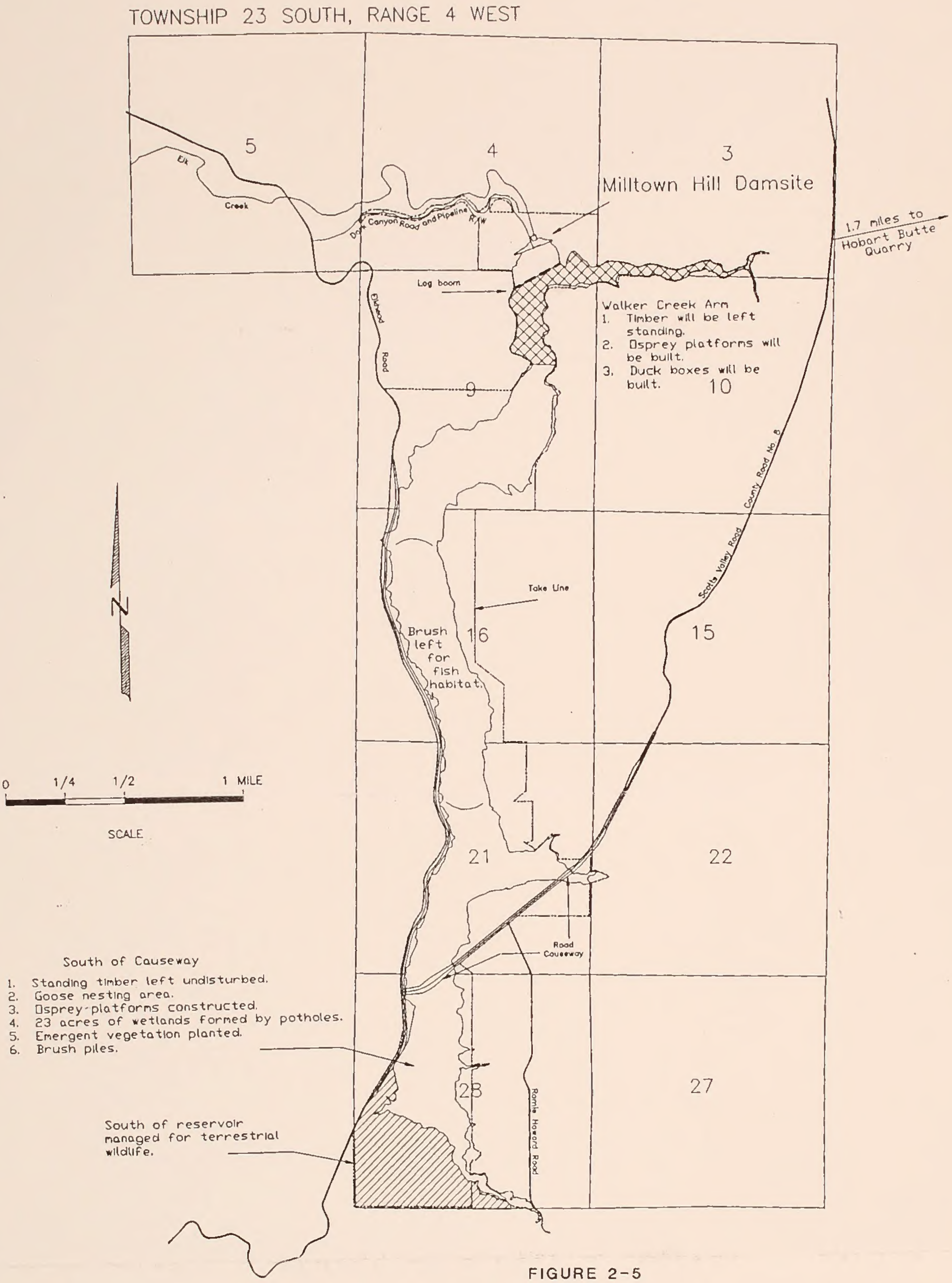
2.2.2.13.2 Wetlands

The plan proposes the development of about 23 acres of permanent, shallow-water wetlands at the upstream end of the reservoir south of the County Road 8 causeway (Figure 2-6). These wetlands would be formed by scooping out shallow depressions in flat areas that would normally be dewatered during summer drawdown. The excavated material would be used to create low berms adjacent to the shallows. The berms would be treated to protect them from erosion and would be planted with herbaceous and woody vegetation tolerant to inundation.

Douglas County would purchase an abandoned 3 acre log storage pond in cooperation with the Oregon Department of Transportation (ODOT). The log pond is located north of Yoncalla in section 28, Township 22 South, Range 5 West. ODOT would use a portion of the land for a maintenance shop. The County would administer the remainder of the grounds and the pond. The county would maintain the pond, the surrounding area, and riparian areas along Yoncalla Creek. The wetland area would be enhanced for wildlife and recreation facilities would be constructed which would be compatible with that use. As a result, there would be a net increase of wetland value in the log pond area. Parking spaces, a rest area, and trails would be included. The County plans to negotiate management of the wetland area with the Yoncalla Recreation District. If the Recreation District would not want to administer the area, the Douglas County Parks Department would assume management responsibilities.

2.2.2.13.3 Habitat for Black-tailed Deer and Turkey

The County would secure 767 acres of habitat for the Federal endangered Columbian white-tailed deer. Habitat would be secured off-site to mitigate for loss of 680 acres of black-tailed deer and turkey habitat. The total amount needed to delist the species is 5,500 acres. The 767 acres would be a portion of the 5,500 acres of Columbian white-tailed deer habitat required by the recovery plan for delisting. This off-site mitigation measure for lost game species values was developed by biologists representing the Fish and Wildlife Service, Oregon Department of Fish and Wildlife, Douglas County, and Bureau of Reclamation. About 2,000 acres of secured habitat exists on Federal, County and State lands.


TOWNSHIP 23 SOUTH, RANGE 4 WEST
5
4
3
9
10
16
15
21
22
28
27
Milltown Hill Damsite
1.7 miles to Hobart Butte Quarry
Elk
Creek
Dark Canyon Road and Pipeline R/W
Log boom
Elkhead Road
Scotts Valley Road County Road No. 8
Take Line
Road Causeway
Ramie Howard Road
N
0
1/4
1/2
1 MILE
SCALE

Walker Creek Arm
1. Timber will be left standing.
2. Osprey platforms will be built.
3. Duck boxes will be built.

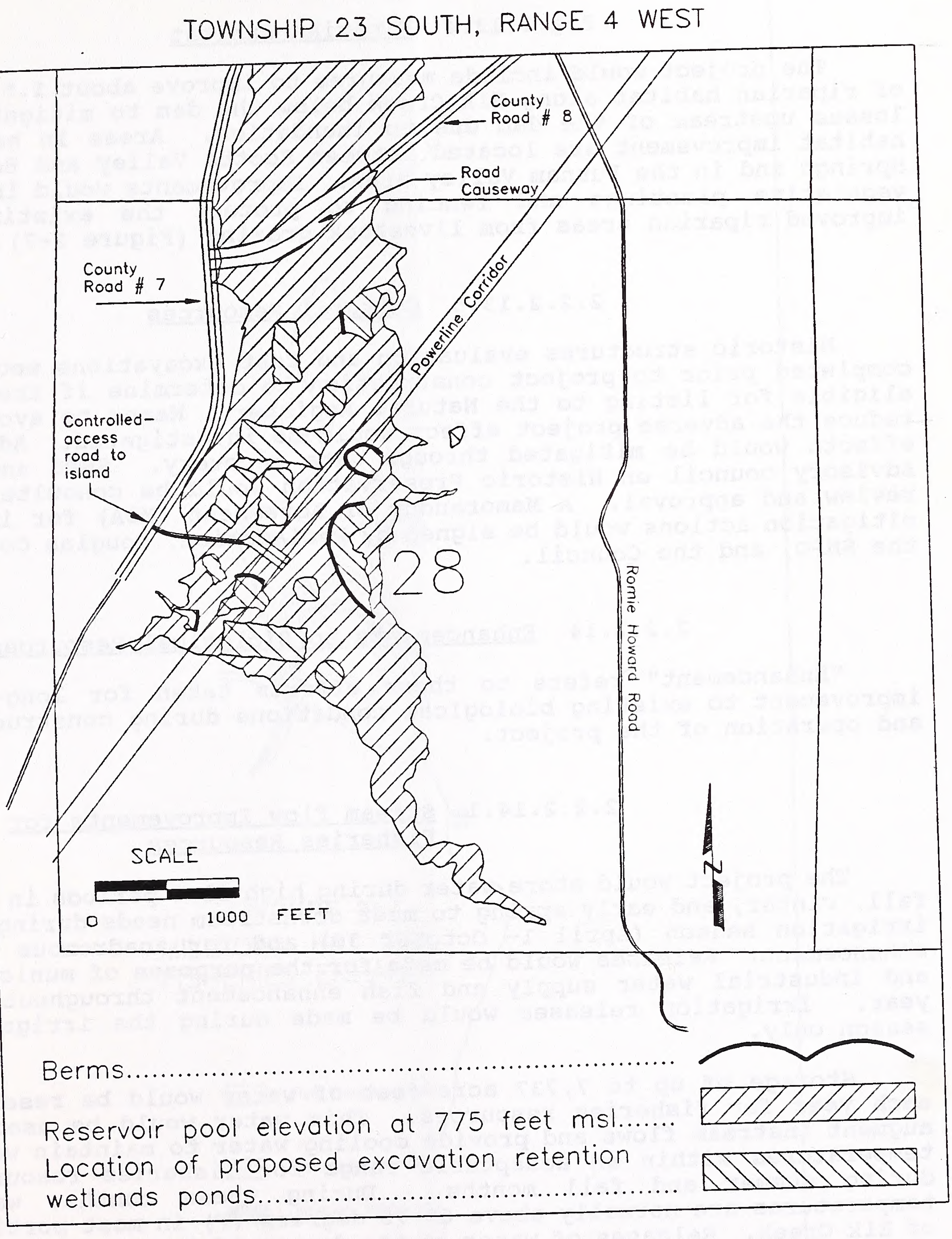
Brush left for fish habitat.

South of Causeway
1. Standing timber left undisturbed.
2. Goose nesting area.
3. Osprey-platforms constructed.
4. 23 acres of wetlands formed by potholes.
5. Emergent vegetation planted.
6. Brush piles.

South of reservoir managed for terrestrial wildlife.

FIGURE 2-5

MILLTOWN HILL PROJECT
WILDLIFE AND FISHERIES MITIGATION


TOWNSHIP 23 SOUTH, RANGE 4 WEST
County Road # 8
Road Causeway
County Road # 7
Powerline Corridor
Controlled-access road to island
28
Romie Howard Road
N
SCALE
0
1000 FEET
Berms
Reservoir pool elevation at 775 feet msl
Location of proposed excavation retention wetlands ponds

MILLTOWN HILL PROJECT
PROPOSED WETLANDS AREA, SOUTH
OF ROAD CAUSEWAY

FIGURE 2-6

2.2.2.13.4 Riparian Habitat

The project would include measures to improve about 1.5 miles of riparian habitat along Elk Creek below the dam to mitigate for losses upstream of the dam due to inundation. Areas in need of habitat improvement are located between Scotts Valley and Boswell Springs and in the Putnam Valley area. Improvements would include vegetative plantings and fencing to protect the existing or improved riparian areas from livestock grazing (Figure 2-7).

2.2.2.13.5 Cultural Resources

Historic structures evaluation and test excavations would be completed prior to project construction to determine if they are eligible for listing to the Natural Register. Means to avoid or reduce the adverse project effect would be investigated. Adverse effects would be mitigated through data recovery. SHPO and the Advisory council on Historic Preservation would be consulted for review and approval. A Memorandum of Agreement (MOA) for impact mitigation actions would be signed by Reclamation, Douglas County, the SHPO, and the Council.

2.2.2.14 Enhancements to Biological Resources

"Enhancement" refers to those efforts taken for long-term improvement to existing biological conditions during construction and operation of the project.

2.2.2.14.1 Stream Flow Improvements for Fisheries Resources

The project would store water during high flow periods in late fall, winter, and early spring to meet downstream needs during the irrigation season (April 1- October 30) and for anadromous fish enhancement. Releases would be made for the purposes of municipal and industrial water supply and fish enhancement throughout the year. Irrigation releases would be made during the irrigation season only.

Storage of up to 7,737 acre-feet of water would be reserved each year for fisheries resources. This water would be used to augment instream flows and provide cooling water to maintain water temperatures within an acceptable range for fisheries resources during summer and fall months. During these months, water temperatures are normally above 65-75 degrees (F) in most portions of Elk Creek. Releases of water at the dam would increase flows in the mainstem during the naturally low flow period of summer and early fall. With control over the temperature of the released water, the cooler water and increased flows would substantially

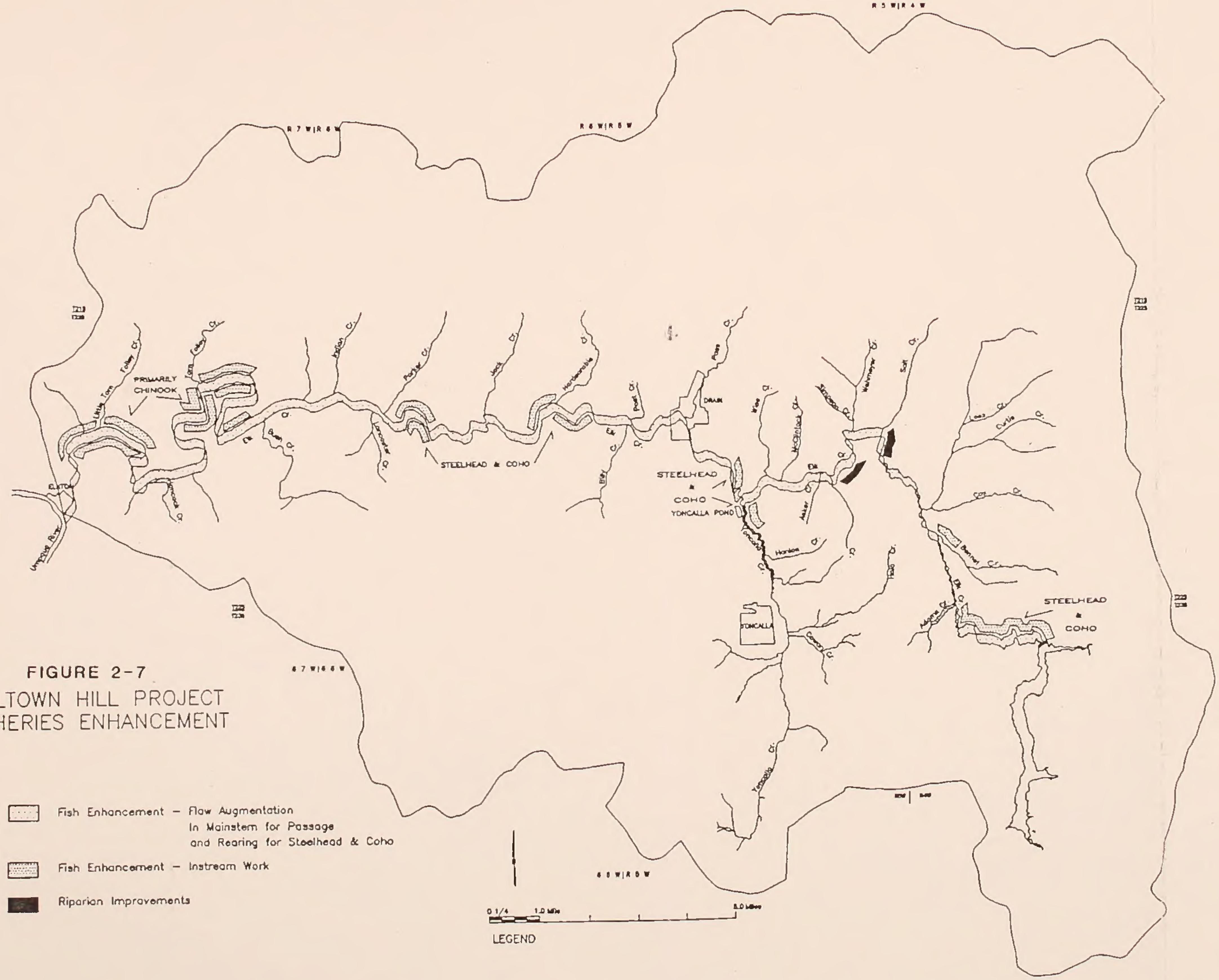


FIGURE 2-7
MILLTOWN HILL PROJECT
FISHERIES ENHANCEMENT

improve rearing habitat for anadromous fish in the mainstem of Elk Creek below the dam. In addition, the Yoncalla Valley pipeline would be used to deliver water to the lower 2.5 miles of Yoncalla Creek for stream flow enhancement during the same low flow period.

2.2.2.14.2 Instream Fish Habitat Improvements

Log or gabion structures would be placed across Elk Creek in certain areas to trap gravels for spawning purposes. Due to the lack of natural gravel recruitment, some gravel may need to be placed along with the gravel holding structures. Approximately 8,000 square feet of gravel would be placed between river miles 39.4 and 34.4, 33,000 square feet of gravel between river miles 34.4 and the mouth, and 4,000 square feet of gravel in the lowest reaches of Adams and Yoncalla Creeks (Figure 2-7). Gravel deposits would be one foot in depth.

2.2.2.14.3 Reservoir Fish Habitat Improvements

Several actions would be taken to ensure good habitat for reservoir fish (Figure 2-5). These actions include leaving timber standing on about 90 acres on the Walker Creek arm of the reservoir and in the northern portion of the reservoir. Timber would also be left standing south of the County Road 8 causeway. Brush piles would be left in the central pool area. In addition, brush piles, tree stumps, and other woody debris would be placed in the main pool area and south of the County Road 8 causeway. Emergent vegetation would be planted in the southern end of the reservoir for habitat enhancement.

2.2.2.15 Construction Schedule and Work Sequence

Douglas County would complete construction of the Milltown Hill Project in four years (Figure 2-8). Operation would begin in year five.

During 1991, some work was completed on the relocation of portions of County Road #7 (Elkhead Road) and County Road #8 (Scotts Valley Road) near the southern end of the proposed reservoir area. The work was undertaken by Douglas County to accommodate construction of a new Pacific Power & Light 500 kV power transmission line through the area and to provide access to a new homesite for a family that would eventually be displaced by construction of the dam and reservoir. Powerline construction was scheduled to begin during the fall of 1991. Much of the material excavated from the new road realignment cuts was placed for the power transmission tower island located in the upper reservoir area. This work represents some of the road relocation scheduled for year 1 construction in Figure 2-8.

Figure 2.8 Construction and Operations Schedule for Milltown Hill Project.

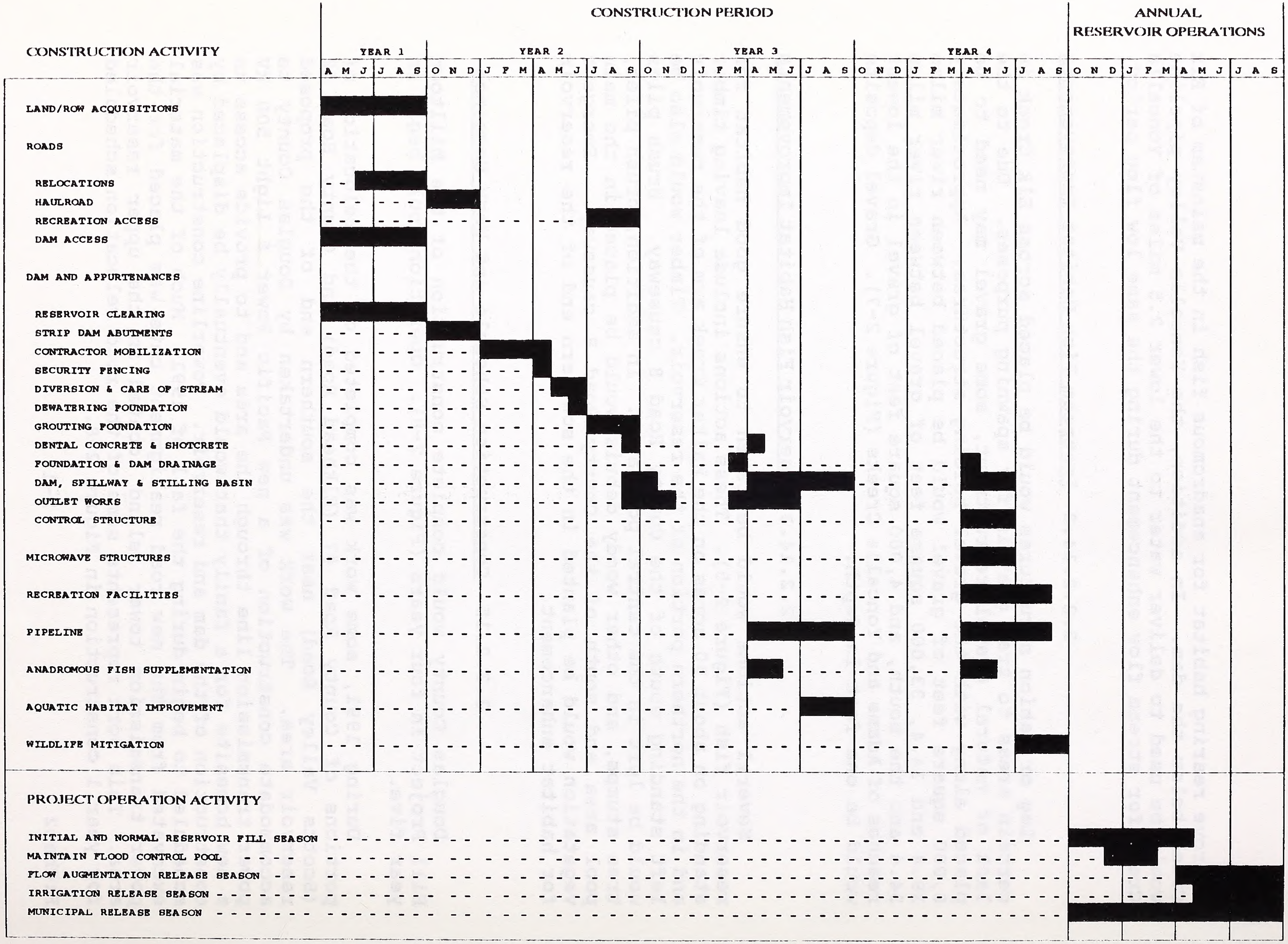


Figure 2-8 does not reflect about a year's worth of lag time between construction year 1 and 2 which will be needed for processing of the Small Reclamation Projects Act loan application plus final approval of Federal funding.

During year 1 the following activities would be done:

- Acquisition of rights of way and properties
- Removal of acquired properties
- Relocation of County Roads #7 and #8
- Construction of the access road to the downstream side of the dam.
- Clearance of reservoir to 780 feet msl.

During year 2 the following construction activities would occur:

- Development of mobilization and construction program
- Construction of the haul road in the reservoir area
- Construction of access road to recreation sites
- Stripping of dam abutments
- Construction of diversion works
- Dewater foundation
- Construction of security fence
- Grout foundation
- Begin dental concrete and shotcrete
- Begin dam, stilling basin and outlet works

During year 3 the following actions would be taken:

- Completion of dental concrete and shotcrete
- Begin foundation and dam drainage
- Continue dam, spillway and stilling basin
- Complete outlet works
- Begin pipeline network
- Construct aquatic habitat improvements in Elk Creek
- Anadromous fish supplementation

During year 4 the following project features would be completed.

- Foundation and dam drainage
- Dam spillway and stilling basin
- Control structures
- Microwave structure
- Recreation facilities
- Pipeline networks
- Wildlife mitigation measures
- Anadromous fish supplementation

2.2.2.16 Project Costs

The total estimated capital cost of the Milltown Hill Project, based on January, 1990 cost levels plus an allowance for projected price increases would be $40,109,910 (Table 2-2). This total includes, in addition to direct construction costs, reasonable allowances for contingencies, investigations, engineering, acquisition of lands, County overhead and legal fees, reimbursable interest during construction and Bureau of Reclamation participation.

Table 2-2. Summary of Estimated Project Costs

Total Direct Cost		$28,836,680
Contingencies @ 10.00%		832,380 [1]
Subtotal		29,669,060
Projected cost increase		1,158,210 [2]
Subtotal		30,827,280
Engineering and Administration		4,654,250
BASE CONSTRUCTION COST		35,481,520
RIDC		820,880
Rights of Way		2,727,500
Bureau Participation		310,000
Application Processing	65,000	
Loan Administration	245,000	
TOTAL CONSTRUCTION COST		39,339,910
Deferred Drainage		425,500
Loan Application Reports		344,500
TOTAL PROJECT COST		40,109,910
Less **COUNTY CONTRIBUTION**		9,822,260
Rights of Way	2,197,000	
Loan Application Reports	228,700	
Filing Fee	5,000	
Deferred Drainage	425,500	
Other (Cash & Services)	6,966,070	
TOTAL FEDERAL SHARE		30,287,640
Loan		23,284,170
Grant		6,162,500
Rights of Way	530,500	
Construction	5,536,290	
Loan Applic & Spec Studies	115,800	
RIDC	820,880	
Less RIDC		(820,880)
TOTAL LOAN OBLIGATION AND GRANTS		29,466,760
Less USBR Prior to Loan		(60,000)
FEDERAL APPROPRIATION REQUIREMENT		29,406,760
Less USBR Loan Administration		(245,000)
TOTAL FUNDS TO BE ADVANCED BY U.S.		29,161,760

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[1] Contingency allowance of 10% included on all project features except dam.

[2] Price increase derived from rate and period between date of estimated and expected start of construction. See Appendices for amount included with each feature.

Source: Myers, 1991.

2.2.2.16.1 Projected Future Costs

On the basis of recent trends, the cost of construction can be expected to rise above current levels. Allowances of 3% per year have been included to accommodate escalation expected to occur between the time of the estimates and start of construction.

2.2.2.16.2 Land Acquisition and Rights of Way

A total area of 1,192 acres would be acquired by Douglas County for Milltown Hill Reservoir and road relocations. Pipeline routing would be located within rights of way for either State or County road rights of way, consequently, no rights of way costs are included for the pipeline.

The cost of acquisition of all properties and rights of way for the project is estimated to total $2,727,500, including contingencies and price increases.

2.2.2.16.3 Engineering and Administration

Douglas County has entered into a memorandum of understanding (MOU) with the Bureau of Reclamation to provide design service. An additional MOU describing construction inspection and administration services, is being negotiated. These costs, exclusive of SRPA program costs, are estimated to be:

MOU costs for preparation of dam designs and specifications	$1,525,000
MOU costs for construction administration	1,627,000

Douglas County has retained J.M. Montgomery Consulting Engineers, Incorporated (JMM) for preliminary and final design, and specification preparation. For the dam and control structure at the base of the dam, an amount of $3,197,000 has been included for these services. The county also would retain a consultant for design and construction administration for the recreation facilities. Road design and construction inspection is to be accomplished by engineers of the County's Public Works Department. Project engineering and administration costs are shown below:

FEATURE	AMOUNT
Road Relocation	$373,200
Dam and Control Structure	3,197,000
Pipeline	1,000,000
Recreation	84,050
Total	$4,654,250

Total engineering and administration costs are about 11.8% of total project costs exclusive of Reimbursable Interest during construction.

2.2.2.16.4 Estimated Direct Cost of Project Facilities

A summary of the estimated direct cost of project facilities are shown below:

FACILITY	COST	SOURCE
Road & Utility Relocation	$3,483,200	County
Dam & Appurtenances	24,325,300	USBR/JMM
Distribution System	6,316,570	JMM
Recreation Facilities	924,540	County
Wildlife Mitigation	358,840	County
Aquatic Habitat Improve.	73,070	County
Project Total	$35,481,520	

2.2.2.16.5 Loan Application Reports and Special Studies

During the course of formulation of the Milltown Hill Project, Douglas County spent $140,000 for general project planning. The county accomplished investigations and studies to further define the potential specifically for anadromous fish enhancement in the amount of $50,000 and $4,500 for recreation facility concepts. Costs for preparation of the Loan Application and Environmental Reports are estimated to total $150,000.

2.2.2.16.6 Bureau of Reclamation Costs

During design and construction of the project, the Bureau of Reclamation would incur costs from activities pertinent to the administration of the Small Reclamations Project Act program, such as loan application review and processing, repayment contract preparation, design review and construction oversight. The overall costs have been estimated to be $310,000, of which $65,000 is for application processing and $245,000 for loan administration.

2.2.2.16.7 Reimbursable Interest During Construction (IDC)

During the construction period interest charges (IDC) would accumulate on costs incurred and/or funds advanced by Bureau of Reclamation. The accumulated total is included in the repayment schedule calculations. The portion of IDC related to water use for purposes other than commercial irrigation is considered reimbursable, and over the repayment period is expected to total $820,880 (Myers, 1991).

2.2.2.16.8 Operation, Maintenance and Replacement Costs

The Milltown Hill Project would be operated by the Douglas County Water Resources Survey as part of the continuing Douglas County Water Resources Program. Major elements of the program include:

- Cooperative stream gaging with the U.S. Geological Survey and the State of Oregon.
- Cooperative Snow Surveys with the U.S. Department of Agriculture.
- County stream gaging program.
- County/National Weather Service Rain Gage Network.
- Dam safety inspections, including use of county-owned equipment for monitoring inclinometers.
- Planning activities for selection and implementation of additional projects.
- Assistance to local entities in solution of water resource problems.
- Cooperation with the state of Oregon District 15 Watermaster's Office.
- Reservoir operation and maintenance of Galesville and Berry Creek projects.

Funds for all the activities of the Water Resources Survey are provided through the Public Works budget and only those costs deemed to be directly attributable to Milltown Hill are expected to be borne by water users (Myers, 1991).

The project would be operated from the operations center in the County Courthouse in Roseburg. Other county projects, such as Galesville, are operated through the Water Resources Survey/Watermaster's Office. Diversions would be administered by the District 15 Watermaster and staff. Customer billing, project accounting, and fiscal services would be accomplished by the administrative staff, coordinated by the Deputy Director. The above activities would be incorporated into the work loads of existing staff and costs would not accrue to project water users for these functions.

Inasmuch as dam safety is an ongoing program, costs for this activity for the Milltown Hill Project would not be broken out or allocated to the project, but would continue to be included in the overall Water Resources budget. Communication costs between Milltown Hill and the control center would not be charged to water users (Myers, 1991).

Routine minor maintenance and incidental operation duties at Milltown Hill Reservoir would be accomplished by the staff of Douglas County's Water Resources Survey, and by a full-time attendant. The cost of the full-time attendant would be shared between the project and the Douglas County Parks Department. The project would then be responsible for one half the employee cost, at an estimated annual amount of $12,000. The attendant would perform minor maintenance duties at the dam, estimated to require about one-half the employee cost to the project. Maintenance needs at the dam of a more serious nature would be met on a scheduled basis, or as-needed, utilizing men and equipment from the County Road and/or County Park Department crews.

The resident attendant also would perform periodic operation and maintenance inspections of the pipeline. This is estimated to require the one-half of the attendant's time. The county plans to retain a contractor, equipped to perform maintenance on the pipeline, on an on-call basis. The estimated cost for pipeline maintenance is estimated at an annual workload of 100 hours at a cost of $75 per hour, totaling $7,500 annually. Maintenance costs are estimated to total $19,500 payable by the project. Of this total, the pipeline functions would be responsible for an estimated total of $13,500 and the dam and reservoir share would amount to $6,000.

Item	Dam	Pipeline	Total
Operation	$ See	Text	----
Maintenance	$ 6,000	$ 13,500	$ 19,500
Replacement	$ 4,777	0	$ 4,777
Total O+M+R	$ 10,777	$ 13,500	$ 24,277

Source: Myers, 1991

A sinking fund amount is estimated for one item, the Systems Control and Data Acquisition (SCADA) equipment, to be installed in the Control Structure at the base of the dam. The total capital cost of the equipment is estimated to be $66,000, according to JM Montgomery estimates of "probable bid price". A life of ten years has been assumed for the equipment, with complete replacement at the end of that time. It is assumed that Douglas County would be able to manage sinking fund amounts to receive an interest income amounting to 7% over this period. The annual sinking fund deposit required to completely replace the SCADA gear at the end of ten years is $4,777 (Myers, 1991).

Douglas County would establish, prior to the beginning of project operation, an emergency reserve in the amount of $40,000.

2.3 Compliance with Applicable Laws, Regulations, and Executive Orders

2.3.1 Reviews, Permits, and Licenses

Reviews, permits, licenses, and other regulatory compliance presented in Table 2-3 would be required by Federal, State, and local agencies for the construction and operation of the proposed project. Douglas County would apply directly to all agencies that require reviews, permits, and licenses.

2.3.2 Compliance with Executive Orders for Flood Plain Management #11988 and Protection of Wetlands #11990

A Draft Environmental Impact Statement of the proposed project would be used to elicit public review and comment as required by Executive Orders 11988 and 11990 and Reclamation's implementation procedures. During public hearings, information would be provided regarding project effects on wetlands and flood plains.

In response to Executive Orders 11988 and 11990, Bureau of Reclamation procedures require responses to the following specific issues in the Draft Environmental Impact Statement:

1. Reason why the proposed action must be located in the flood plain or wetlands.

Dams and reservoirs, by their very nature, must be located in flood plains to impound surface water. Associated structures that might be damaged by flooding, such as the relocated road, would be located outside the flood plain. Other facilities would be designed to withstand flooding.

Scattered, small patches of seasonal wetlands, having emergent vegetation, occur in the irrigation areas (approximately 28 acres). Douglas County would notify landowners of the locations of these wetlands. No project drainage or change in agricultural practices will occur to negatively affect jurisdictional wetlands at the time the water service contract is negotiated. This will be enforced by County with a wetland protective clause in the water service contract between the County and individual water user.

Table 2-3. Reviews, Permits and Licenses Required by Federal, State and Local Agencies.

Agency	Act or Regulation	Requirement	Procedure for Compliance
Environmental Protection Agency	National Environmental Policy Act (NEPA)	Environmental Impact Statement (DEIS)	Submit USBR's EIS to EPA. -Prepare FEIS, submit to EPA -Issue decision notice
Advisory Council on Historic Preservation	National Historic Preservation Act, Sec. 106 Executive Order 11593, Sec. 2 (b) (36 CFR 800)	Compliance with provisions of the Act and Executive Order	Preliminary consultation with State Historic Preservation Office (SHPO). SHPO reviews EIS through A-95 Clearinghouse procedure.
National Park Service	National Historic Preservation Act, Sec. 106 Executive Order 11593, Sec. 2 (b) (36 CFR 800)	Compliance with provisions of the Act and Executive Order.	Agency reviews EIS
National Marine Fisheries Service	NEPA, Fish and Wildlife Coordination Act	Compliance with provisions of the Acts	NMFS cooperates with USBR in preparation of anadromous fisheries components of EIS. Review DEIS for adequacy

Table 2-3. (Continued)

Agency	Act or Regulation	Requirement	Procedure for Compliance
U.S. Fish and Wildlife Service	Endangered Species Act, Fish and Wildlife Act of 1956, Fish and Wildlife Coordination Act, Fish and Wildlife Improvement Act, Migratory Bird Conservation Act, Bald Eagle Protection Act, NEPA	Compliance with provisions of the Acts	Request listing of endangered and threatened species; consultation. USFWS cooperates with USBR in preparation of EIS. Review DEIS for adequacy
Bureau of Land Management	Federal Land Policy and Management Act of 1976 (FLPMA)	Compliance with Provisions of the Act	BLM is a cooperating agency.
	FLPMA and 43 CFR 2800	Easement or permit for use of BLM public domain land	Submit application.
	Revested Oregon & California Railroad and Reconveyed Coos Bay Wagon Road Grant Lands Act of 1937	Easement or permit for use of O & C lands	Submit application. Review DEIS for adequacy
Corps of Engineers/Oregon Division of State Lands	Section 404 (Joint permit with Oregon Division of State Lands)	Dredge and Fill Permit for dam, reservoir, and fish enhancement work	Submit application to Corps and DSL. Review DEIS for adequacy

Table 2-3. (Continued)

Agency	Act or Regulation	Requirement	Procedure for Compliance
Oregon Department of Environmental Quality	Federal Water Pollution Control Act Amendments of 1972, Sec. 401	Water Quality Certificate	Submit application Review DEIS through A-95 clearinghouse procedure.
Oregon Division of State Lands	Section 404 (Joint Permit with Corps)	Dredge and Fill Permit for dam, reservoir, and fish enhancement work	Submit application to DSL and Corps
Oregon Department of Forestry	ORS 527.611 or 527.730	Forest Practices Act	Permit to operate machinery on forest land. Meet or exceed standards to protect water quality. Review DEIS through A-95 clearinghouse procedure
Oregon Department of Water Resources	ORS 537	Water rights	Submit application. Public hearing and Water Policy Review DEIS through A-95 clearinghouse procedure
	ORS 540.350 to 540.390	Dam safety review and inspection	Submit plans and specifications for approval.

Table 2-3 (Continued)

Agency	Act or Regulation	Requirement	Procedure for Compliance
Oregon Department of Land Conservation and Development	ORS 197	Review of County land use actions for compliance with statewide goals.	Review initiated by appeal to Land Use Board of Appeals. Document Findings of Fact.
Douglas County	Comprehensive Plan and Zoning	Plan and Zone Amendment	Submit application. Planning Commission hearing. Board of Commissioners action to approve plan amendment.
	Development ordinance	Building Permit	Submit application.

2. **Facts considered in making the determination to locate in the flood plain or wetlands.**

The benefits of supplying M&I and irrigation water as well as flood control benefits and instream flows would outweigh the harm to natural and beneficial values of flood plains.

There are ample opportunities to replace lost values to wetlands by developing wetlands in the upper reservoir or in abandoned log storage ponds.

3. **Statement on whether the proposed action conforms to applicable state or local flood plain or wetland protection standards.**

The proposed project should conform to state and local standards for protection of public facilities within the 100-year flood plain. It would comply with the Statewide Planning Goals and Guidelines, as excepted, including Goal 5 (wetlands) and Goal 7 (flood plains).

4. **Statement on whether the action affects the natural and beneficial value of the flood plain and wetlands.**

Dam construction and operation would have both positive and negative effects. However, the positive effects would outweigh the negative effects. Operation for flood control would help prevent losses of public and private lands historically subject to flood damage. It would also narrow the downstream 100-year flood plain, making some lands more suitable for human use and habitation.

A consequence of flood control, however, is long-term elimination of the seasonal flooding that deposits nutrients, organics, and sediments that temporarily accelerate, until it reaches a new equilibrium, due to lowered deposition of sediments trapped by the dam.

Wetlands would not be converted to agricultural lands when additional irrigation water becomes available. Wetland lost in the area of reservoir inundation would be mitigated.

5. **Steps taken to design or modify the proposed action to minimize harm to or within the flood plain or wetlands.**

The design would take into consideration the need to protect the dam from the probable maximum flood, as well as protect downstream properties.

6. Restoration of flood plain and wetland values, if applicable to the proposed action.

Flood plain values would be at least partially offset by the enhancement of riparian areas downstream of the dam. Wetlands lost in the inundation area of the reservoir would be offset by the creation of wetlands in the upper end of the reservoir and by maintenance of wetland value in log storage ponds.

2.4 Other Alternatives Considered but Excluded from Detailed Study

2.4.1 Structural Alternatives Investigated

The following storage sites were explored (Clair Hill and Associates, 1968, 1969, 1971; International Engineering, 1978 and 1980), including the preferred alternative, on tributaries to Elk Creek and Elk Creek mainstem (Figure 2-9). A summary of findings for each alternative is listed in Table 2-4.

2.4.1.1 Tributaries to Elk Creek

Billy Creek. This site, also called Skull Mountain site, is located on Billy Creek, approximately 1/2 mile south of its junction with Bear Creek (Section 24, T. 22S., R. 6 W.). This site has an 80,000 acre-foot capacity. However, precipitation records indicate the drainage area yield would not exceed 28,000 acre-feet. The Scotts Valley and Yoncalla Valley service areas would not be served, due to high pumping costs. Therefore, the site was dropped from further investigation. The city of Drain subsequently developed a 290-acre-foot reservoir on Bear Creek, a tributary of Billy Creek.

Adams Creek. This site is located on Adams Creek, approximately 1/2 mile from its confluence with Elk Creek (Section 6, T.23S., R 4W.). Preliminary geological investigations indicate this site may be structurally suitable for a dam which would store only 2,000 acre-feet although 1,500, 3,500 and 6,800 acre-feet sites were evaluated. This small watershed would not yield enough water for all the service areas and the costs per acre-feet were excessive, therefore the site was dropped from further investigation. At present, the city of Yoncalla has a permit for the diversion of 1.5 cfs of water from Adams Creek. This water is pumped to Wilson Creek, then piped 4 miles and stored in a 100 acre-foot reservoir near Yoncalla.

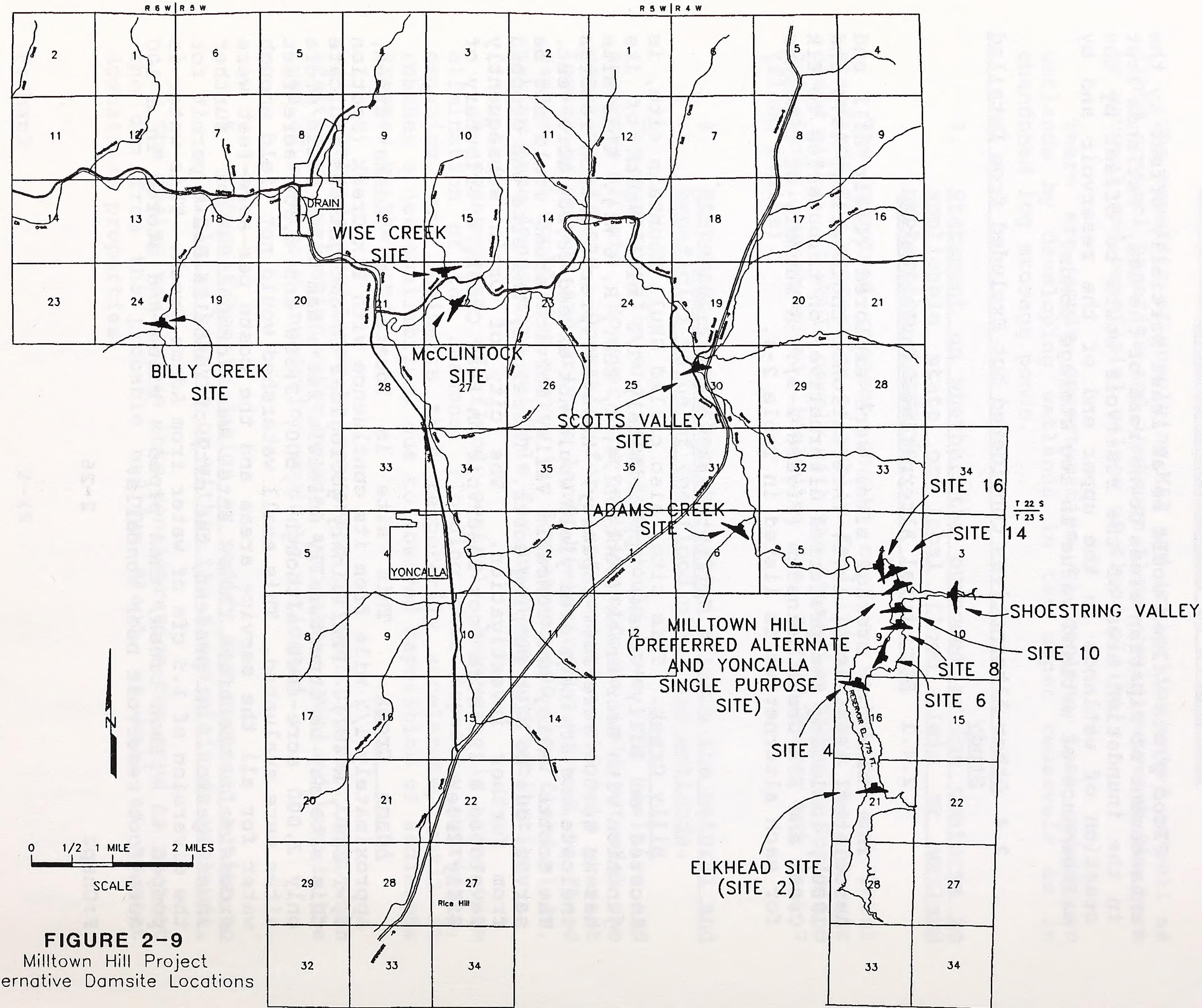


FIGURE 2-9
Milltown Hill Project
Alternative Damsite Locations

Table 2-4. Structural and Non-structural Alternatives Investigated.

ALTERNATIVES	FINDINGS
1. Structural	
A. Sites Located on Elk Creek Tributaries	
Billy Creek	-Insufficient water yield -High costs of pumping water to service area in Scotts Valley and Yoncalla Valley.
Adams Creek	-Small yield -Geological conditions would provide for a reservoir of only 2,000 acre-feet; not adequate for service area needs.
Wise Creek	-Inadequate yield. -Slide potential on both abutments.
Shoestring Valley (Walker Creek)	-Yield of only 12,500 acre-feet. -Larger reservoir would be cost prohibitive.
B. Sites Located on Elk Creek Mainstem	
Drain (McClintock)	-Would inundate Scotts Valley service area. -Prohibitive costs of I-5 relocation. -Loss of Scotts Valley service area. -High cost of pumping to service areas in Yoncalla Valley.
Scotts Valley (Elk Creek)	-Would inundate Scotts Valley service area. -Would inundate I-5. -Loss of Scotts Valley service area. -High cost of pumping to Yoncalla Valley service area. -High cost of I-5 relocation
Yoncalla Single Purpose	-Unacceptable to local Douglas County Water Resources Management Plan and the Oregon Water Resources Commission's Basin Program Statement. Would serve the needs of Yoncalla Valley only.
Site 2	-Inadequate reservoir capacity.
Site 4	-Inadequate reservoir capacity.
Site 6	-Geologically inadequate.
Site 8	-Geologically inadequate.
Site 10	-Geologically inadequate.
Site 12 (Preferred Alternative)	-Meets all needs of service areas. Geologically acceptable
Site 14	-Geologically inadequate.
Site 16	-Geologically inadequate, working room for dam construction not adequate.
C. Other Structural	
Interbasin Transfer	-Institutional constraints. -Inadequate water supply.
Ground Water Pumping	-Inadequate water supply. -High pumping costs.
2. Non-Structural	
Purchase of irrigation	-Counter to diversification of water employment base. -Would apply to Drain only because Yoncalla would have no source.
Conservation	-Active Conservation programs are in effect.

Wise Creek. This site is located on Wise Creek, approximately 2 miles southeast of Drain (Section 22, T.22S.,R.5W.). The site was dropped from further investigation due to slide potential on both abutments and inadequate water yield.

Shoestring Valley. This site is located on Walker Creek approximately 1/2 mile from its confluence with Elk Creek. (Section 10, T.23S.,R.4W). Initial investigations indicated the average yield for this reservoir would not exceed 30,000 acre-feet. More detailed studies showed that the storage capacity could be only 12,500 acre-feet. The physical formation of the area provides for only an 80-foot structure, capable of storing only 12,500 acre-feet. A larger structure would be cost prohibitive.

2.4.1.2 Elk Creek Mainstem

Drain. This site, also called the McClintock site, is located on Elk Creek, approximately 4 miles upstream of the town of Drain (Section 22, T.22S.,R.5W.). Potential storage capacity is 220,000 acre-feet, but the average yield would not exceed 115,000 acre-feet. A reservoir at this site would inundate the entire Scotts Valley service area and a 2-mile segment of Interstate 5. Relocation of approximately 4 miles of I-5 would be required. The costs of the relocation of I-5, and the cost of pumping water to the Yoncalla Valley service area, plus the loss of the Scotts Valley service area, indicated the site did not warrant further investigation.

Scotts Valley. This site, also called the Elk Creek site, is located on Elk Creek, at river mile 33.5 (Section 30, T.22S.,R.5W.). Potential storage capacity is 100,000 acre-feet, with an annual yield of 75,000 acre-feet. This site would inundate Interstate 5, but not to the extent the Drain site would. It would also inundate most of the Scotts Valley service area. Cost of highway relocation, pumping cost to the Yoncalla Valley service area, and loss of Scotts Valley service area, plus the possibility of leaks in both abutments indicated the site should not be further investigated.

Yoncalla Single Purpose. This alternative is located in Section 4, T.23S.,R.4W at the same site as the preferred alternative. It differs from the preferred alternative in that it would provide only 5,350 acre-feet solely for municipal and industrial use in the Yoncalla - Rice Hill area. This alternative was dropped from further study after local interests determined it unacceptable, since it addressed only a portion of their needs.

Elk Creek Dam Axis Alternatives. A reconnaissance investigation identified 8 potential dam sites in the upper reaches of Elk Creek. Three sites were in Section 4. They were site 12 (Milltown Hill), site 14, and site 16. Three sites were in Section 9. They were site 6, site 8 and site 10. One site was in Section 11 (Elkhead site, site 2). One site was in Section 16, T.23S.,R.4W. (site 4). Area capacity curves were developed for 5 of these sites. Estimates were made of volumes of materials required for a typical dam, using a normal water surface elevation of 800 feet msl for each of the five sites. Two sites failed to meet the criteria. Three sites, including the preferred alternative site were further inspected for geological foundation conditions. The Milltown Hill alternative had the most favorable material for structural adequacy for dam foundation, permeability, and related problems concerning spillway and outlet construction, and availability of materials for embankment (Table 2-3).

Reclamation and County decided to limit future studies to the preferred alternative. All structural alternatives which involved a reservoir capacity less than desired were considered not acceptable, and they were dropped from further investigation, since they would not provide enough water to meet County goals and the needs of the subbasin.

2.4.2 Other Structural Alternatives

Two additional alternatives were investigated. An investigation revealed that ground water supplies are inadequate for the future needs of the service areas (USGS, 1977), and pumping costs would be prohibitive. An interbasin diversion of water was also considered. This alternative would involve the transfer of water from the Coast Fork Willamette River, near London, to the Elk Creek drainage. Investigations indicated the supply of water is inadequate and the cost of either a tunnel or a pumping facility as well as a diversion structure would be prohibitive.

2.4.3 Non-Structural Alternatives

Non-structural alternatives considered were water conservation and retirement of irrigation land. The purchase of irrigation water would be counter to the effort the county is making toward providing greater opportunities to diversify its employment base. The cities of Drain and Yoncalla are unique for their size. They have implemented conservation measures such as metered water supplies and both cities maintain active conservation programs. Further conservation measures would not appreciably increase available water supplies and would still be unresponsive to the long-term goals of the county, the cities, and the farming communities of Elk Creek subbasin.

2.5 Comparison of Environmental Impacts of Alternatives

The preferred alternative and the no-action alternative are compared in Table S-2 in the Summary section. A more in-depth analysis is presented in Section 3, Affected Environment and Environmental Consequences.

3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

The National Environment Policy Act of 1969 (NEPA) requires that an Environmental Impact Statement be written for a proposed federal project or a federally funded project which would affect the human environment. The Environmental Impact Statement is to be developed using the guidelines established by the Council on Environmental Quality (CEQ). Public scoping and agency consultation processes must adhere to CEQ's guidelines. For the proposed Milltown Hill Project, these processes have been on-going for over 3 decades. During these processes, especially during the past 3 years, potential problems have been identified which required the need for ancillary studies, to provide information for evaluation of impacts of project construction and operation. These studies were conducted and are reported in various Technical Appendices and special reports (See: Table 4-1 Section 4, Consultation and Coordination).

This EIS addresses each known environmental component which could be affected by the project. The existing conditions, impacts, and mitigative and enhancement measures for most components are addressed commensurate with the level of concern identified during the public scoping process, agency consultation process, and in subsequent studies. When additional concerns were identified during impact evaluation they were treated commensurate with the magnitude of impact expected. The main concerns of the agencies and the public were the adverse impacts of reservoir inundation and the favorable impacts of the predicted change of Elk Creek water regime on the existing biological environmental components.

Consequences of constructing and operating the proposed project will be quantified, whenever possible, in terms of incidence, intensity, magnitude and duration. Mitigation measures to offset adverse impacts will also be quantified when possible. Enhancement measures will be addressed separately. Based on the level of impact expected on various environmental resources, environmental commitments are proposed to ameliorate or avoid impacts (Appendix B).

3.1 Preferred Alternative

This EIS addresses construction impacts and operation impacts separately, as appropriate. Construction activities would be localized and would occur primarily in and near the reservoir pool area during a 4-year period.

The relative proximity and timing of construction activities and the similarity of impacts expected allows an analysis of impacts by grouping all activities under "construction impacts" for each environmental component.

Construction activities in the reservoir area include:

- Constructing the service road (Dark Canyon Road) from County Road #7 to the base of the dam
- Constructing the haul road in the reservoir area
- Preparing the Otten Quarry for extraction of rock material
- Operating a rock crusher in the staging area and in the contractor work area for aggregate sizing
- Operating a batch plant for roller compacted concrete processing in the staging area
- Constructing and using 2 or 3 settling ponds (1/4 to 1 acre each) in the work area for cleaning fines from crushed aggregate
- Stockpiling and mixing aggregate in the contractor work area or in the staging area
- Constructing the dam and appurtenances
- Removing overburden from the dam abutments and hauling to the eastern recreation site
- Setting of 2 coffer dams and a diversion in Elk Creek at the damsite and across Elk Creek near Otten Quarry
- Clearing of timber in the main pool area
- Recontouring of the eastern recreation site
- Relocating portions of County Roads #7 and 8
- Constructing two causeways on County Road #8 across the reservoir
- Constructing the transmission tower island and excavating wetlands south of the causeway
- Placing the buried pipeline and electrical transmission line in the road right-of-way of Dark Canyon Road
- Constructing the recreational facilities
- Constructing the microwave tower and facilities

Construction activities are scheduled as shown in Figure 2-8.

Construction activities away from the pool area would involve the installation of an irrigation pipeline network in the service areas.

An Annual reservoir operation schedule is shown in Figure 2-8. Operation of the project would cause impacts in the reservoir pool area, but the majority of potential impacts during operation would occur in Elk Creek downstream of the dam. These impacts will be discussed under "operation impacts" for each environmental component.

3.1.1 Topography

3.1.1.1 Existing Topography

Elk Creek, in the northern portion of Douglas County, Oregon, is a subbasin of the Umpqua River Basin. Elk Creek flows from east to west, extends about 45 miles from its source in the foothills of the Cascade mountain range to its confluence with the Umpqua River near Elkton, and is about 290 square miles in area. Elevation ranges from 150 feet to 2600 feet. Topography is generally mountainous, with rounded slopes, incised by steep, narrow canyons. Topographic relief is more pronounced in the higher eastern part of the subbasin, which exhibits well dissected topography with narrow, steep-walked valleys in a deeply entrenched dendritic pattern. Topographic relief in the western portion of the subbasin is less pronounced.

The watershed for the reservoir heads at the Calapooya Divide about 7 to 8 miles upstream from the damsite (river mile 39.4) with the divide trending both east and south of the reservoir area. Water drains from Dickinson Mountain trending along the west side of the reservoir and from the east and north from the north trending ridge between Harness Mountain and Hobart Butte. Tributaries to Elk Creek above the dam are Shingle Mill, Walker and Lane Creeks. The total watershed of the dam is approximately 28 square miles, with elevations ranging from 600 feet at the damsite to approximately 2600 feet in the higher ridges along the southern subbasin boundary. The reservoir created by the Milltown Hill Dam would inundate approximately 680 acres at normal full pool elevation of 775 feet.

3.1.1.2 Topography Impacts

3.1.1.2.1 Construction

The topography would be altered from a vegetated meandering broad valley by construction of the 186 foot-high dam, and a resulting 680-acre reservoir. Major topographic changes would result from overburden removal for preparation of the dam and rock extraction from the Otten Quarry. Relatively minor changes in topography would result from relocated roads, causeways, recreation sites, and the transmission line island in the south end of the reservoir.

3.1.1.2.2 Operation

The operation of the reservoir would result in a change in topography, depending on season. During reservoir drawdown, the present vegetated area would be replaced by mud flats in the south end of the reservoir. This would occur during the irrigation season (April 1 to October 30). Reservoir level would decrease until winter rains begin to occur (approximately November). The reservoir would continue to fill until sometime in the spring, when the rainy season ends.

3.1.1.3 Mitigation of Topography Impacts

Topographic impacts cannot be fully mitigated. A stream valley setting would be exchanged for a reservoir setting. Cuts and fills required for road relocation would be minimized as possible during final design. The topographic impacts caused by the new roads would not be significantly different from present conditions. Cuts and fills on relocated and new roads would be sloped to prevent landslides and would be revegetated to decrease erosion. The recreation areas would be constructed to fit with present topographic features and landscaped with native plants. The island needed for powerline transmission towers would be contoured and landscaped to fit topographic features.

3.1.2 Geology and Seismicity

3.1.2.1 Existing Conditions

The oldest geologic formations in and surrounding the project area are of relatively recent origin, dating to the early Tertiary Period (70 million years before present), when the Cascadian mountain-making epoch began (Table 3-2-1). Rocks in the project area are mostly Tertiary volcanics and sediments. The oldest rocks are of the Umpqua formation, up to 12,000 feet thick, formed in the early Eocene epoch.

Table 3-2-1. Geologic Time Chart to 70 Million Years Before Present.

ERA	PERIODS	EPOCHS	ROCK FORMATIONS
Cenozoic	Quaternary	Holocene (Recent)	Alluviums and Landslide Debris
		Pleistocene (Glacial)	Unconsolidated Alluvium Landslide Debris
	Tertiary	Pliocene (Modern Plants and Animals Developed)	
		Miocene (Development of Large Mountain Ranges	
		Oligocene (Development of higher mammals)	Fisher (Pyroclastics, Volcanics) Spencer (Sandstones, Siltstones)
		Eocene (Mammals Became Dominant Animals)	Tyee (Sandstones, Siltstones) Umpqua (Volcanics)
		Paleocene	

The Tyee Formation, of the middle Eocene epoch, overlies the Umpqua formation in sandstone and siltstone beds up to 30 feet thick. Later, in the late Eocene epoch, to the middle Oligocene epoch, the Spencer formation, comprised mostly of sandstone and siltstone, overlaid the Tyee formation.

Above the Spencer formation is the Fisher formation, up to 5,000 feet thick, consisting of pyroclastic and volcanic rocks, which formed the western Cascade Range, during the middle Oligocene epoch. The above formations are interspersed with dikes of the most recent Miocene age (Bureau of Mines, 1990). Unconsolidated Quaternary deposits include Pleistocene alluvium on terraces along the Umpqua River, and Pleistocene and recent landslide debris in the river's tributaries. The area contains three parallel, northeast-trending anticlines, doubly plunging northeast and southwest (Figure 3-2-1). Basalt flows of the Umpqua formation are exposed in the center of these anticlines. The dam site is near the axis of the northeast-trending Red Hill anticline which is broken by northwest-trending normal faults and northeast trending reverse faults (Figure 3-2-1). (Bureau of Mines, 1990; Geological Survey, 1963).

Seismicity in western Oregon is sparse, poorly located, and poorly understood. The largest historical event in the region occurred offshore of the Oregon - California border in 1873 and was estimated with an intensity magnitude of 7. The area near the Milltown Hill site is notable for its lack of seismicity (Bureau of Reclamation, 1990).

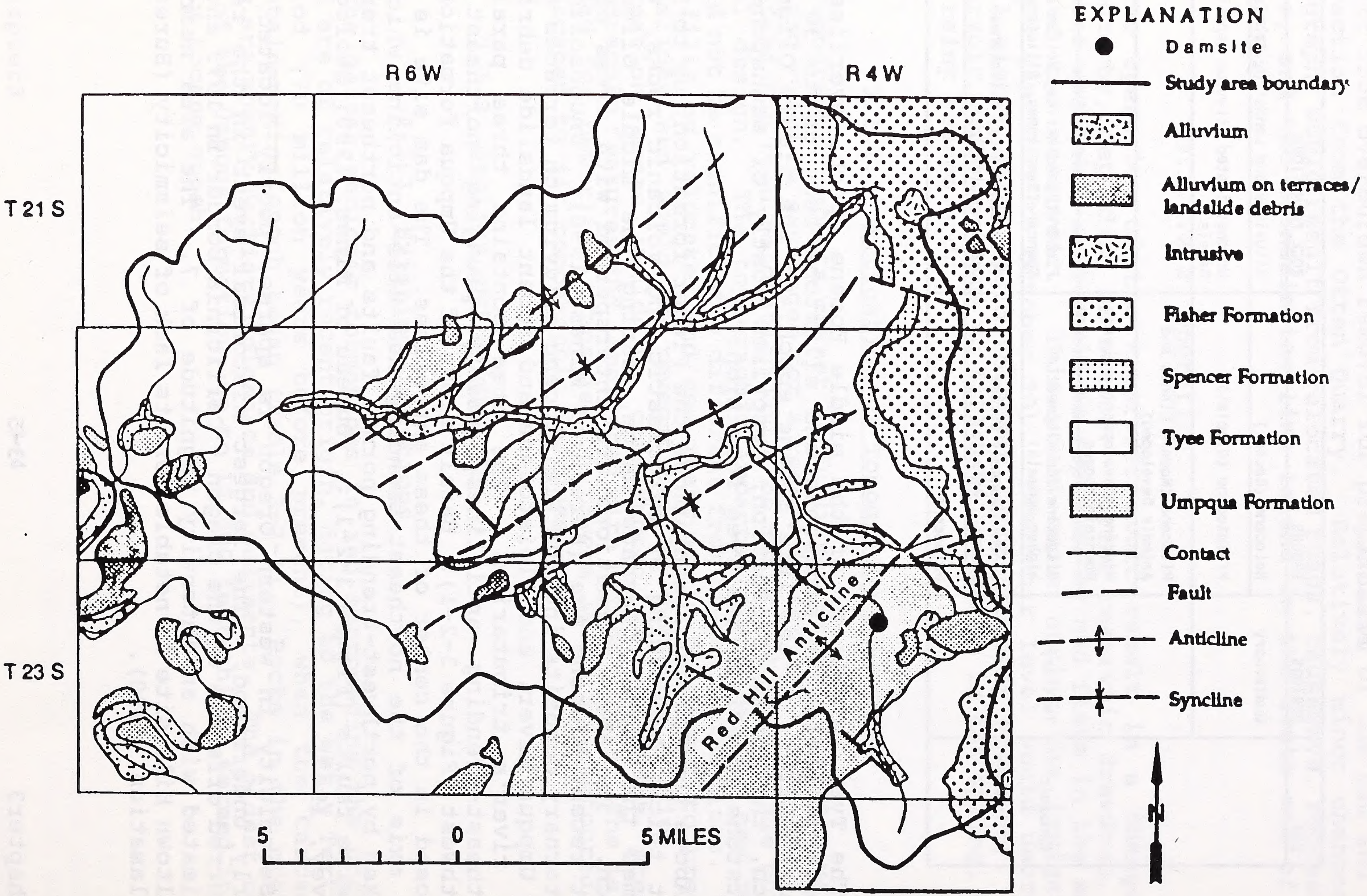


Figure 3-2-1. Geology of the project area. (modified from U.S. Bureau of Mines, 1990)

Douglas County is situated at the western edge of the North American plate along the Cascadia subduction zone, where active subduction of the Juan de Fuca plate beneath the North American plate is occurring. The coast range province has experienced a very low level of historical seismicity and is not known to contain any active faults.

The average seismic energy release in the coast range for the 100-year period from 1870 to 1970 is approximately equivalent to one magnitude 5.0 earthquake each decade. Observations at the Corvallis, Oregon seismograph station indicate continuing minor seismic activity in the coast range area between Drain and Reedsport on the coast.

Analysis of these events, area geology, and geological investigations at the Milltown Hill damsite resulted in the determination of a maximum credible earthquake of a magnitude 6.25. Structures designed for this site should be capable of withstanding this maximum credible earthquake (Bureau of Reclamation, 1990).

3.1.2.2 Impacts of Geology and Seismicity

Historically, Oregon has not experienced earthquakes which would have caused significant damage to a dam constructed at the Milltown Hill site. Strong earthquakes which could occur off the coast of Oregon or California would be too distant from the project site to be considered potentially seismic hazardous. A broad seismic zone map of the United States developed by the Corps of Engineers indicates the proposed project is located in seismic zone 1 (minor damage), which is assigned a seismic coefficient of 0.025g.

Reservoir-induced seismicity is not a potential hazard. The proposed reservoir is too small and shallow to be a likely cause of induced earthquakes. Furthermore, the local geologic conditions and lack of seismicity in the area suggests that reservoir-induced seismicity does not warrant engineering considerations for this site. The lack of potentially active faults in the reservoir subbasin suggests that an earthquake-induced wave on the reservoir is not a design consideration (Bureau of Reclamation, 1990). The dam has been designed to withstand the maximum anticipated earthquake for the area.

3.1.2.3 Mitigation of Geologic Hazards and Seismic Conditions

Plans and specifications of the Milltown Hill dam would be reviewed by a qualified Board of Consultants, to assure that the project is designed according to accommodate any known geologic hazard or anticipated seismic conditions. Construction supervision would be provided by competent engineering staff. A resident engineer and appropriate inspectors, technicians and support personnel would continuously monitor construction quality. The County would prepare detailed operation and maintenance plans.

3.1.3 Soils and Land Classification

3.1.3.1 Existing Soils and Land Classification

The soils of the Elk Creek subbasin area may be categorized into three main groups: recent alluvial, old alluvial and residual (Bureau of Reclamation, 1991).

- Recent alluvial soils are generally the most productive within the subbasin. They are located on low terraces bordering streams. These soils are characterized by little or no profile development. They are generally medium textured, deep and well drained.
- Old alluvial soils are more extensive. They are located between the recent alluvial soils on low terraces and the residual soils on footslopes and hillsides. These soils are characterized by fine textured subsoils with moderately slow to slow permeability. Some small areas of hydric soils are associated with this group. Vegetation in these hydric soils is predominantly sedges and rushes.
- Residual soils are the most extensive in the subbasin, but are less important than the alluvial soils because they are comparatively shallow over bedrock. Also, they occur on the more sloping lands in the subbasin. These soils developed in place from materials derived from both igneous and sedimentary rocks. Depth to bedrock is highly variable over short distances.

All soils in the subbasin are free of harmful levels of salinity and sodicity. Organic matter content is relatively high, and soil pH is neutral to slightly acid.

Land classifications were made to segregate arable land from nonarable land and to divide the arable lands into economic classifications in which the physical differences in land reflect dollar differences in net farm income. A review of previous work covering more than 15,000 acres combined with specific site analyses and laboratory tests resulted in the land class specifications presented in Table 3-3-1.

The arable area comprises all land delineated in the land classification that will provide sufficient income to warrant consideration for irrigation development. In general, arable land is land which, when irrigated, has the capacity to generate

Table 3-3-1. Summary of Arable Land Class Specifications.

Class 1	Class 2	Class 3	Class 4P
Soil Characteristics			
Sandy loam through clay loam except as noted below.	Loamy sand to permeable clay.	Loamy sand through permeable clay.	Same as Class 3.
Sand permitted below 36 inches with available water holding capacity of 6 inches or more in upper 48 inches.	Loamy coarse sand or sand permitted below 24 inches with available water holding capacity of 4.5 inches or more in upper 48 inches.	Loamy coarse sand or sand permitted below 12 inches with available water holding capacity of 3 inches in the upper 48 inches.	No sand, loamy sands or sandy loams permitted.
No clay, silty clay, or sandy clay in upper 30 inches.	Permeable clay permitted below 12 inches.	Entire profile may be permeable clay if infiltration rate is adequate for plant moisture requirements.	Same as Class 3.
5 feet or more to impermeable material.	4 feet or more to impermeable material.	3 feet or more to impermeable material.	1.5 feet or more to impermeable material.
Sodium Absorption Ratio should be less than 10 in fine (clay) textured soils but may range to 20 in coarse textured soils with adequate drainage.	Same as Class 1.	Same as Class 1.	Same as Class 1.
Equilibrium salinity less than 4 milliohms per centimeter with adequate drainage.	Equilibrium salinity less than 5 milliohms per centimeter with adequate drainage.	Equilibrium salinity less than 8 milliohms per centimeter with adequate drainage.	Same as Class 3.
Topographic Characteristics			
General gradient not to exceed 6 percent but may include small escarpments or other topographic features which exceed this slope limitation when land considerations would dictate their inclusion.	General gradient not to exceed 12 percent but may include small escarpments or other topographic features which exceed this slope limitation when land considerations would dictate their inclusion.	Same as Class 2. exceed 20 percent.	General gradient not to exceed 20 percent
Minimum size of 8 acres. Width of field generally is more than 400 feet.	Minimum size of 5 acres. Width of field generally is more than 300 feet.	Minimum size of 2 acres. Width of field generally is more than 200 feet.	Same as Class 3.
May spend up to $233 per acre to make land tillable and suitable for movement of sprinkler system.	May spend up to $467 per acre to make land tillable and suitable for movement of sprinkler system.	May spend up to $700 per acre to make land tillable and suitable for movement of sprinkler system.	No Development Costs
Cover can be removed with $233 or less per acre.	Cover can be removed with $467 or less per acre.	Cover can be removed with $700 or less per acre.	No Development Costs
Drainage Characteristics			
Surface drainage can be provided with $233 or less per acre. Surface outlet excavation needed.	Surface drainage can be provided with $467 or less per acre. Surface outlet excavation needed.	Surface drainage can be provided with $700 or less per acre. Surface outlet excavation needed.	No Development Costs
Permissible Development Costs			
Development cost of $233 or less per acre.	Development cost of $467 or less per acre.	Development cost of $700 or less per acre.	No Development Costs

Major surface outlets for each farm over $375 per acre and all subsurface drainage will be provided as a project cost. Lands potentially arable, but nondrainable within cost limitations, will be designated 6D.

Source: Bureau of Reclamation, 1991.

sufficient income to cover all farm production expenses and still provide a reasonable family income. Certain conditions are crucial:

- Farms must be of adequate size considering climate and economic setting.
- Farms must be provided with the essential on-farm improvements. Examples could be removing vegetation and other cover, leveling, soil reclamation, drainage, and irrigation-related facilities.

The land classification process identified approximately 7,377 acres of arable land as shown in Table 3-3-2. The distribution of these lands is shown on Figure 3-3-1.

Table 3-3-2. Arable Lands (Acres).

Location	Class 1	Class 2	Class 3	Class 4P	Total
Lower Elk Creek	422	303	231	775	1,731
Upper Elk Creek	230	347	123	185	885
Yoncalla Valley	69	529	1,490	1,213	3,301
Scotts Valley	125	429	516	390	1,460
Totals	846	1,608	2,360	2,563	7,377

Lower Elk Creek is Drain to Elkton.
Upper Elk Creek is upstream of Drain to Interstate 5.

Source: Bureau of Reclamation, 1991.

Nonarable land is usually represented as class 6 land. Any deficiency that would increase costs of production to where a farm could not provide a reasonable income is considered nonarable. Nonarable lands not measured or tabulated in the land classification survey included creeks and adjacent riparian areas, steeply sloping wooded hillsides, roads and highways, and residential areas. The only nonarable land that was delineated and measured was classed as "6sd;" signifying wetlands with emergent aquatic vegetation. (See: Section 3.1.11, Vegetation).

The primary problem regarding the suitability of area lands for sustained irrigation is restricted subsurface water movement and inadequate natural drain channels. Heavy winter and spring rainfall aggravates the drainage problems and delays farm operations that involve tillable crops. Some farmers have installed shallow tile drains to relieve the water table after the spring rains to allow earlier tilling of the soil. The high water table is a lesser concern for hay, grass, and livestock operations. With the added irrigation component during the dry summer months (which are normal drain out periods), the high water table conditions during the spring would increase, and drainage problems would be intensified and enlarged. Those lands that may require drainage facilities are shown on Figures 3-3-2 and 3-3-3. Drainage would not affect wetlands.

Hydraulic conductivity tests were conducted in the Scotts Valley and Yoncalla Valley areas and in some of the parcels along Elk Creek that require supplemental irrigation. The resulting hydraulic conductivity rates used for drain spacing calculations are noted below.

- Lower Elk Creek from Drain to Elkton -- 3.6 inches per hour (in/hr).
- Upper Elk Creek from Drain to Interstate Highway 5 along Elk Creek, and from the intersection of Elk and Yoncalla Creeks 1 1/2 miles south to the confluence of Hanlon Creek -- 1.0 in/hr.
- Yoncalla Valley -- 1.2 in/hr.
- Scotts Valley -- 2.20 in/hr.

The estimated acres for each area where subsurface drainage would be required and field cost per acre for drains in each area are shown in Table 3-3-3. Subsurface interceptor drains are also included in the cost estimates. These drains are intended for use in small, narrow tracts of land which lie below irrigated lands that are steeper and which tend to provide runoff and seepage to the areas below.

A significant amount of land classified as arable also has been mapped by the Soil Conservation Service (SCS) as having hydric soils. The SCS mapping is in conjunction with its responsibility for determining wetlands in irrigated areas, however wetlands would not be drained.

The irrigation suitability land classification included a screening procedure for trace elements and other potentially toxic constituents. Some of the elements of concern were determined from Federal Primary and Secondary Drinking Water Standards and EPA priority pollutants. Other elements considered to be relatively nontoxic to humans or animals were included because of potential corrosion, discoloration, or esthetic concerns. The results of these tests indicated that all constituents were within the range of baseline levels typical for the western United States.

Table 3-3-3. Summary of Estimated Drainage Costs Per Acre.

Service Area	Area drained (acres)	Drain spacing (feet)	Length of Pipe Req'd (feet/acre)	Subsurface Drain ($/acre)	Outlet Drains ($/acre)	Total field cost ($/acre)
Scotts Valley						
w/ Outlet Drains	85	235	185	370	75	445
w/o Outlet Drains	343	235	185	370	-	370
Subtotal	428					
Yoncalla						
w/Outlet Drains	128	165	264	525	75	600
w/o Outlet Drains	506	165	264	525	-	525
Interceptor Drain	114			300	-	300
Subtotal	748					
Lower Elk Creek						
w/ Outlet Drain		425	102	205	75	280
w/o Outlet Drain	42	425		205	-	205
Interceptor Drain	103			300	-	300
Subtotal	145					
Upper Elk Creek						
w/ Outlet Drain	248	225	194	390	75	465
w/o Outlet Drain				390	-	390
Total	1,569					

Source: Bureau of Reclamation, 1991.

In compliance with the Farmland Protection Act, Public Law 97-99, the SCS was contacted to identify lands classified as prime and unique farmlands. As a result the SCS conducted a survey of the area within the reservoir take-line and the irrigation service areas for prime and unique farmlands. Prime and unique farmlands are defined as follows:

Prime farmland - land that has the best combination of physical and chemical properties for producing sustained high yields of crops when treated and managed according to acceptable farming methods. Approximately 115 acres of prime farmland were found in the reservoir area (Figure 3-3-4). No prime farmlands were found in the service areas.

Unique farmland - land other than prime farmland that could be used for the production of specific high value, high yield food and fiber crops, such as citrus, tree nuts, cranberries, fruit, and vegetables. No unique farmlands were found in either the reservoir area or the service areas.

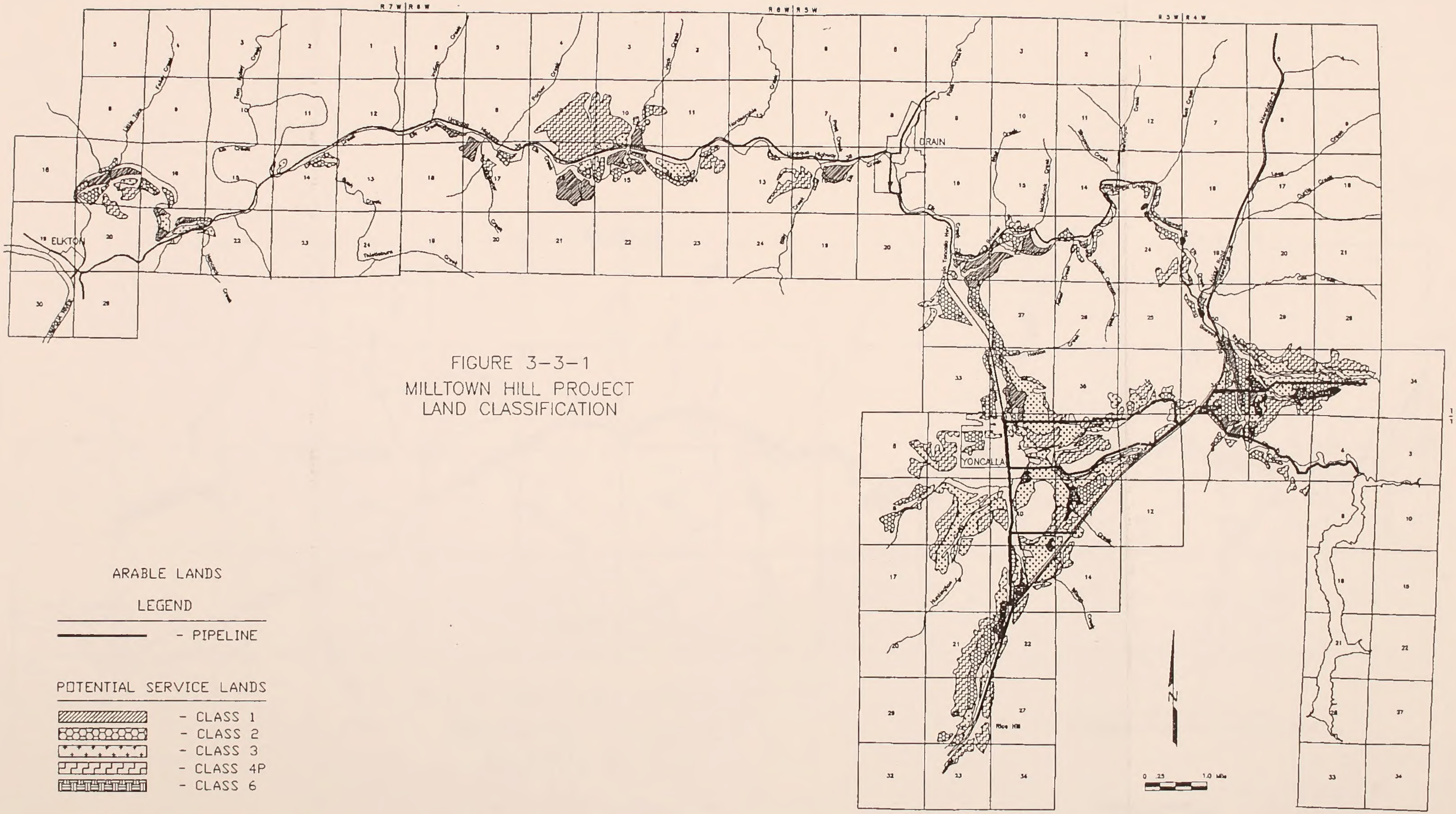
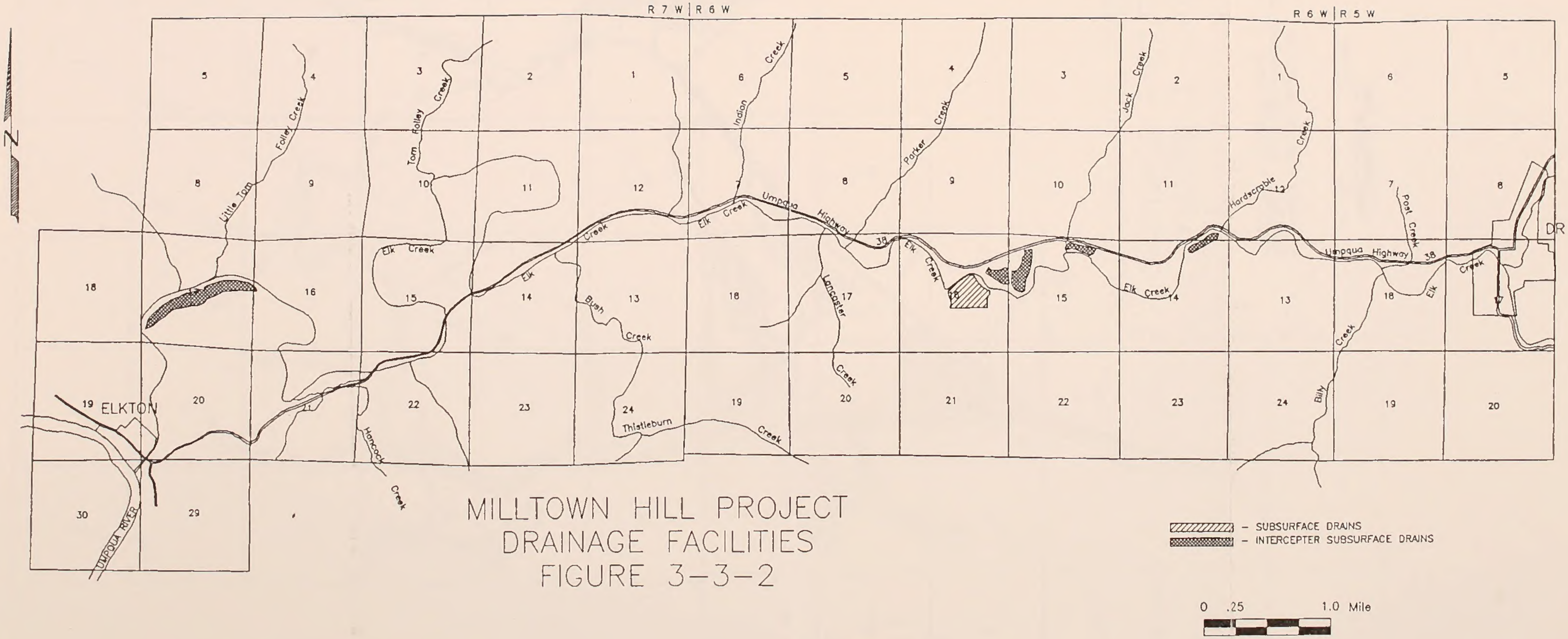
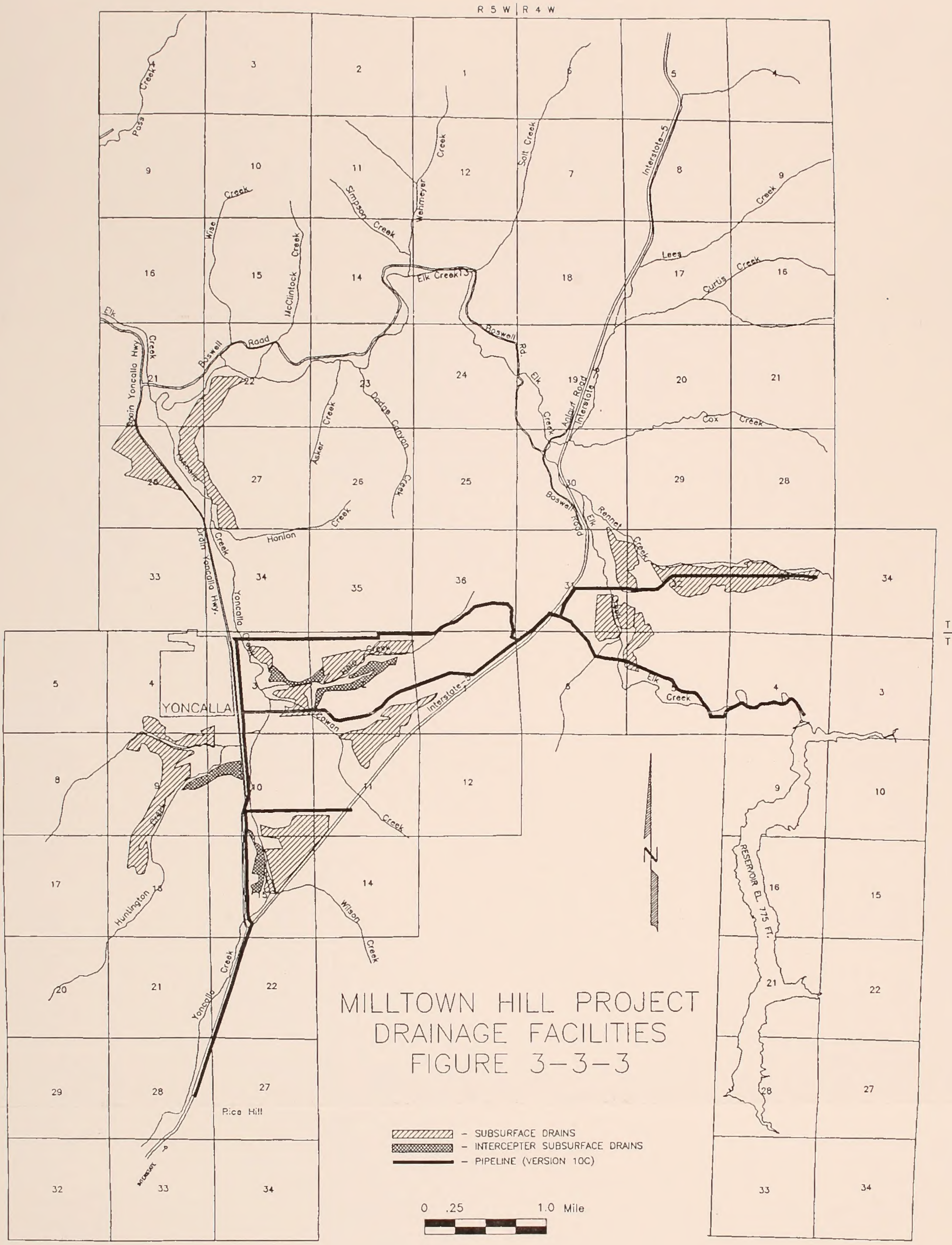


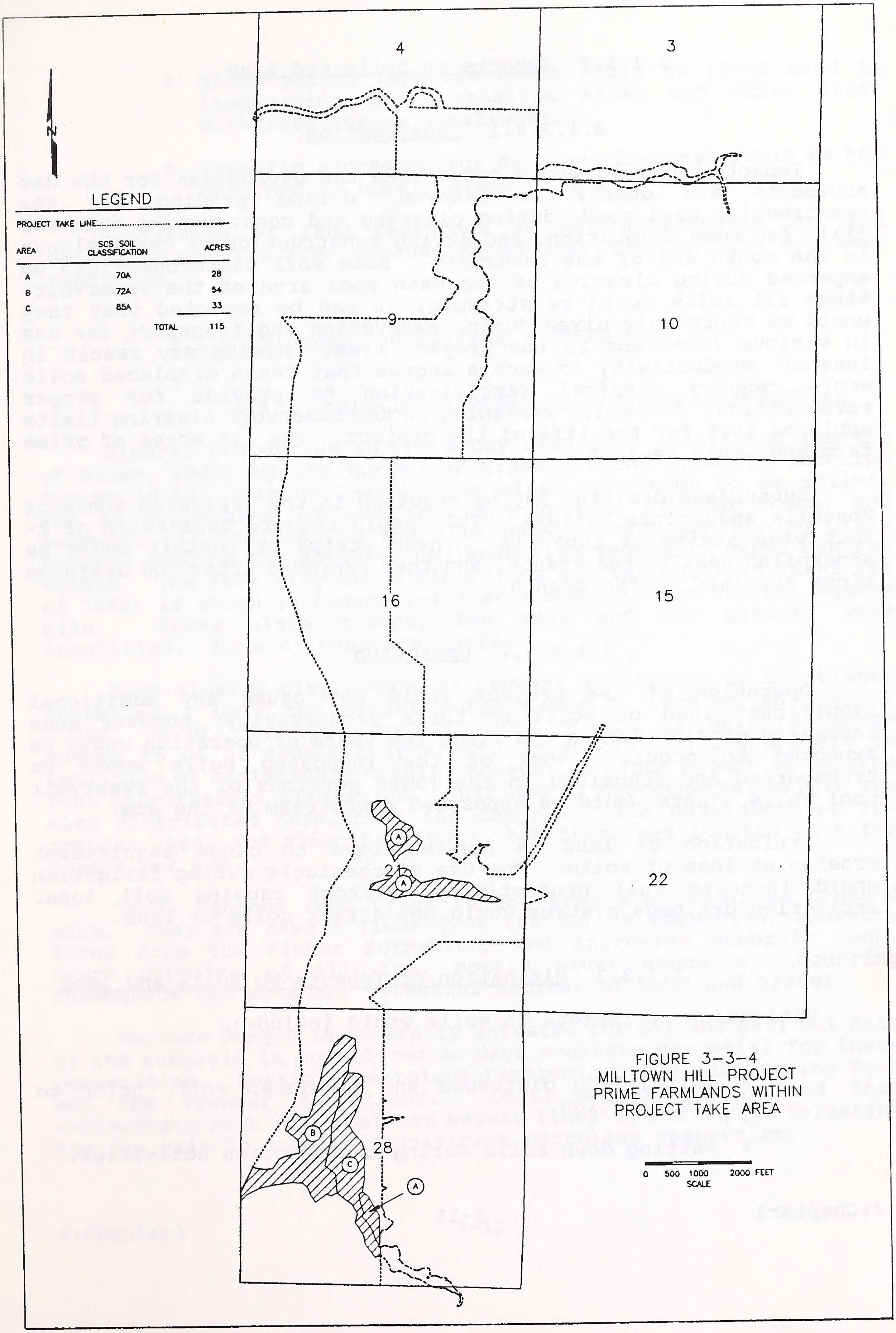
FIGURE 3-3-1
MILLTOWN HILL PROJECT
LAND CLASSIFICATION



MILLTOWN HILL PROJECT
DRAINAGE FACILITIES
FIGURE 3-3-2



MILLTOWN HILL PROJECT
DRAINAGE FACILITIES
FIGURE 3-3-3



LEGEND

PROJECT TAKE LINE..........

AREA	SCS SOIL CLASSIFICATION	ACRES
A	70A	28
B	72A	54
C	85A	33
	TOTAL	115

FIGURE 3-3-4
MILLTOWN HILL PROJECT
PRIME FARMLANDS WITHIN
PROJECT TAKE AREA

3.1.3.2 Impacts to Soils and Land

3.1.3.2.1 Construction

Impacts to soils would occur when the overburden for the dam abutments and quarry is removed, during grading for the construction haul road, during clearing and constructing cuts and fills for road relocation, and during construction of the wetlands in the south end of the reservoir. Some soil disturbance can be expected during clearing of the main pool area of the reservoir. Since all soils would be stripped, it can be expected that they would be thoroughly mixed during excavation and transport for use in various locations in the project area. Mixing may result in loss of productivity to such a degree that these displaced soils would require chemical fertilization to provide for proper revegetation. The soils remaining in the reservoir clearing limits would be lost for the life of the project. The 115 acres of prime farmland would be lost.

Subsurface drainage may be required in the irrigated areas of Yoncalla and Scotts Valleys. This would require excavation of 2-foot wide strips of topsoils. These strips of topsoil would be stockpiled next to the trench, and then replaced after the drainage pipes are laid in the trench.

3.1.3.2.2 Operation

Operation of the project would not cause any additional significant loss of soils or their productivity, however some increased erosion during the first few years of operation would be expected to occur. Some of the inundated soils would be transported and deposited in the lower portions of the reservoir pool while others would be deposited downstream of the dam.

Irrigation of land is not expected to cause significant erosion or loss of soils. The use of chemicals during irrigation would increase soil productivity, without causing soil loss. Irrigation drainage systems would not affect soils or land.

3.1.3.3 Mitigation of Impacts to Soils and Land

Mitigation of impacts to soils would include:

- Fertilizing disturbed and displaced soil, prior to revegetation.
- Wetting down soils during construction activities.

- Stock piling topsoils which would be later used in landscaping the recreation areas and other areas disturbed during construction.

- Topsoils excavated for drainage trenches would be the returned to upper levels of the trenches.

Mitigation of land resources is not anticipated for the irrigation service area because no adverse impacts have not been identified.

3.1.4 Mineral and Aggregate Resources

3.1.4.1 Existing Mineral and Aggregate Resources

Mineral properties in the study area were identified (Bureau of Mines, 1990) by the Bureau of Mines Mineral Industry Location System (MILS) (Figure 3-4-1). No mines are known to be active. The 24 properties include sand and gravel, crushed stone, and mercury. In addition to the MILS data, recent BLM mining claim records account for activity on lands with federally owned mineral estate. The federally owned mineral estate for the study area (as of 1984) is shown in Figure 3-4-2 at a scale to the nearest square mile. Three claim groups, two lode and one placer, were identified. None of them are active.

High-alumina clay occurs at several localities in the Fisher formation. Only the Hobart Butte deposit, located in Sec.31, T.22S., R.3W., and Sec. 36, T. 22S., R.4W., is believed large enough to be of economic interest. Most clay in the deposit is kaolinite of sedimentary origin; however, a minor amount is derived from hydrothermal alteration. Sulfides of hydrothermal origin are also distributed throughout the deposit. The most abundant are realgar (AsS) and stibnite (Sb_2S_3), but these are limited to a few pounds per ton.

Three igneous rock types in the area are useful as crushed rock. They are basalt flows from the Umpqua formation, andesite flows from the Fisher formation, and intrusive gabbroic rock. Large deposits of alluvium, mostly river deposits, occurring throughout the area are potential sources of sand and gravel.

Western Oregon is generally untested for oil and gas, but most of the subbasin is considered to have moderate potential for these commodities. Possible petroleum reservoir rocks include the Tyee and the Spencer formations. Local studies determined that sedimentary rock units between basalt flows of the Umpqua formation are too thin to contain significant petroleum reservoirs.

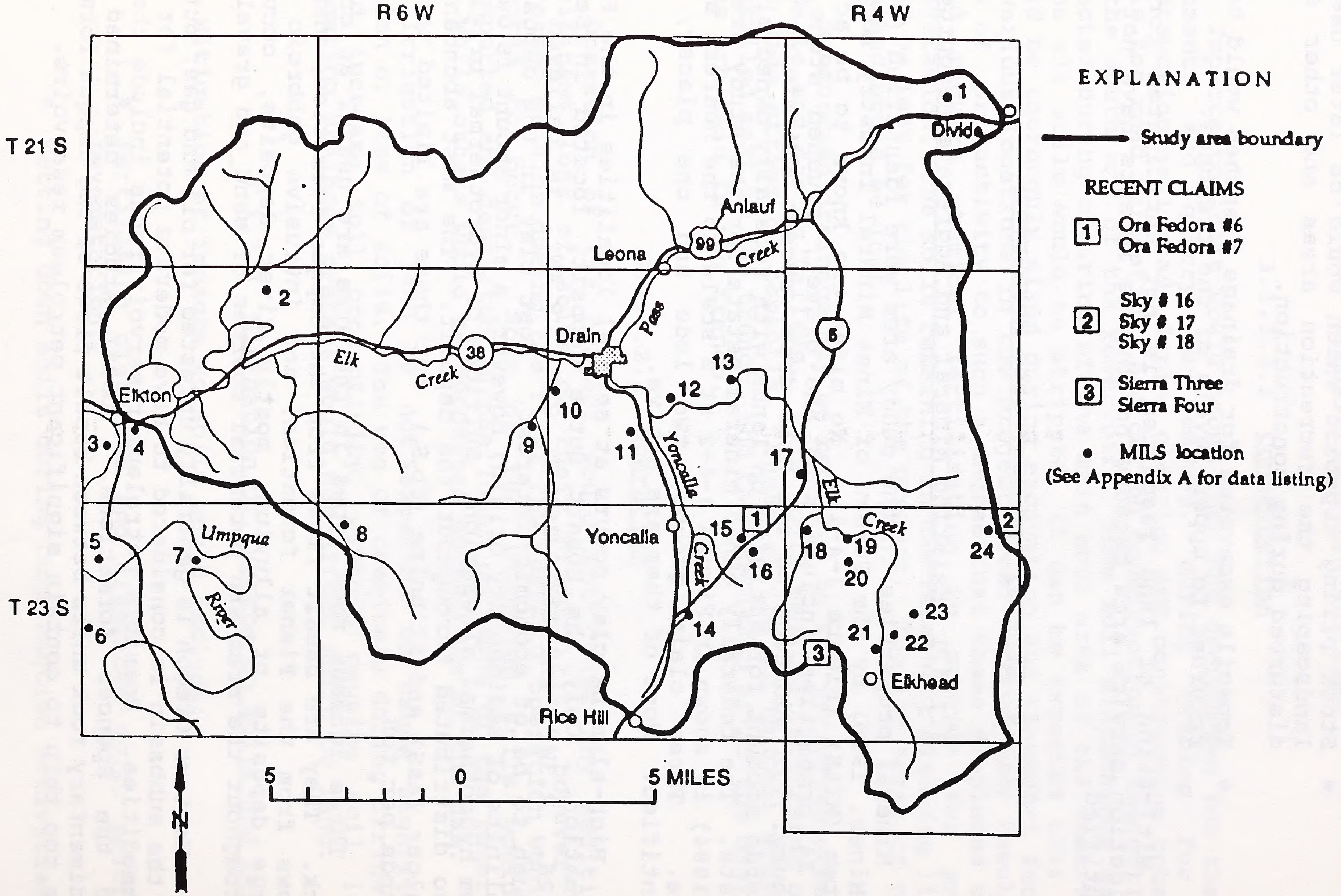


Figure 3-4-1. Location map of past and present mineral exploration and development activity (U.S. Bureau of Mines, 1990)

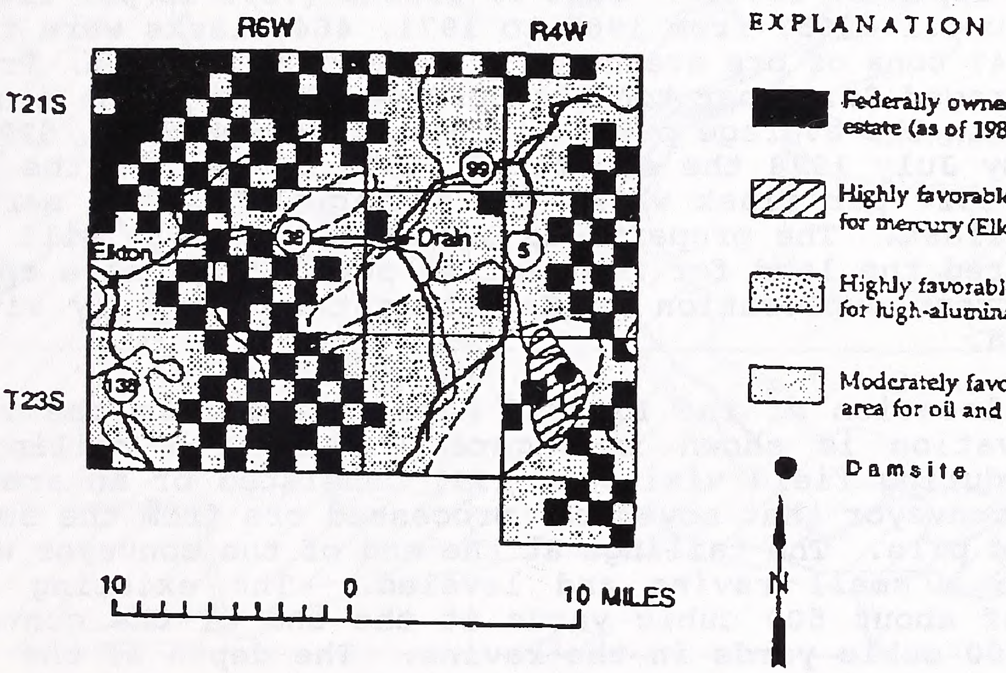

R6W
R4W
T21S
T23S
Elkton
Drain
38
99
5
138
EXPLANATION
Federally owned mineral estate (as of 1984)
Highly favorable area for mercury (Elkhead deposit)
Highly favorable area for high-alumina clay
Moderately favorable area for oil and gas
Damsite
10
0
10 MILES
N

Figure 3-4-2. Federally owned mineral estate and mineral resource potential (Bureau of Mines, 1990).

Four mercury (Cinnabar-H_2S) properties occur within the project area. They are the Elkhead Mine in the NE1/4 Sec. 21, T.23S., R.4W. the Thompson Prospect in the SW1/4 Sec. 15, T.23S., R.4W.; the Wilson Prospect in the N1/2 N1/2. Sec. 8, T.23 S., R.4W.; and the Allen Prospect in the N1/2 SW1/4. Sec.21, T.23S., R.4W. The latter mine is located within the project "take line". However, significant mineral development occurred only at the Elkhead Mine. The Elkhead deposit was discovered in 1870 and was worked intermittently until 1971. Development consists of an open cut and 1,800 ft of underground workings which explored the ore zone to a depth of 150 ft. Just 87 flasks (76.5 lb per flask) were produced until 1965; from 1965 to 1971, 464 flasks were recovered from 17,647 tons of ore averaging 2 lb mercury per ton. Production costs averaged $9.34 per ton ($295.96 per flask). The mine closed in 1971 when the average price for mercury dropped to $292.41 per flask. By July 1978 the estimated costs to operate the mine has risen to $524 per flask while the average price for mercury was $150 per flask. The property is currently owned by Bill Dedmore, who acquired the land for residential purposes. There appears to be no current exploration or development for mercury within the study area.

The location of the Elkhead Mine relative to the reservoir pool elevation is shown in Figure 3-4-3. The tailings areas observed during field visits in 1991 consisted of an area at the end of a conveyor that moved the processed ore from the smelter to a tailings pile. The tailings at the end of the conveyor were then pushed to a small ravine and leveled. The existing tailings consist of about 500 cubic yards at the end of the conveyor and about 2,200 cubic yards in the ravine. The depth of the tailings at the end of the conveyor is about 15 feet. Tailings in the ravine are between 4 and 8 feet deep. Surface area of the tailings is about 50 feet by 100 feet. An inspection of the site showed the surrounding vegetation and underlying soil to be relatively stable. No evidence was noted of marked earth movement or slippage, including the existence of displaced or bent trees. Also, the demarkation between natural soils and the mine tailings is readily apparent, indicating that the tailings have remained essentially intact for a considerable period of time.

Although the potential for discovering additional mercury resources is high in the region, including in the Elkhead deposit, it seems unlikely that exploration and development will occur in the foreseeable future due to the probable small deposit sizes and high operating costs. The world mercury commodity summary shows a current excess of mercury in government stock piles. It also indicates that, at current production rates, there are sufficient world resources for about 100 years. Presently, only one domestic mine is producing mercury as the primary commodity. Remaining domestic mercury is produced as a byproduct from nine gold mines or as secondary mercury recovered through recycling. If additional domestic production is needed, it will most likely come from large

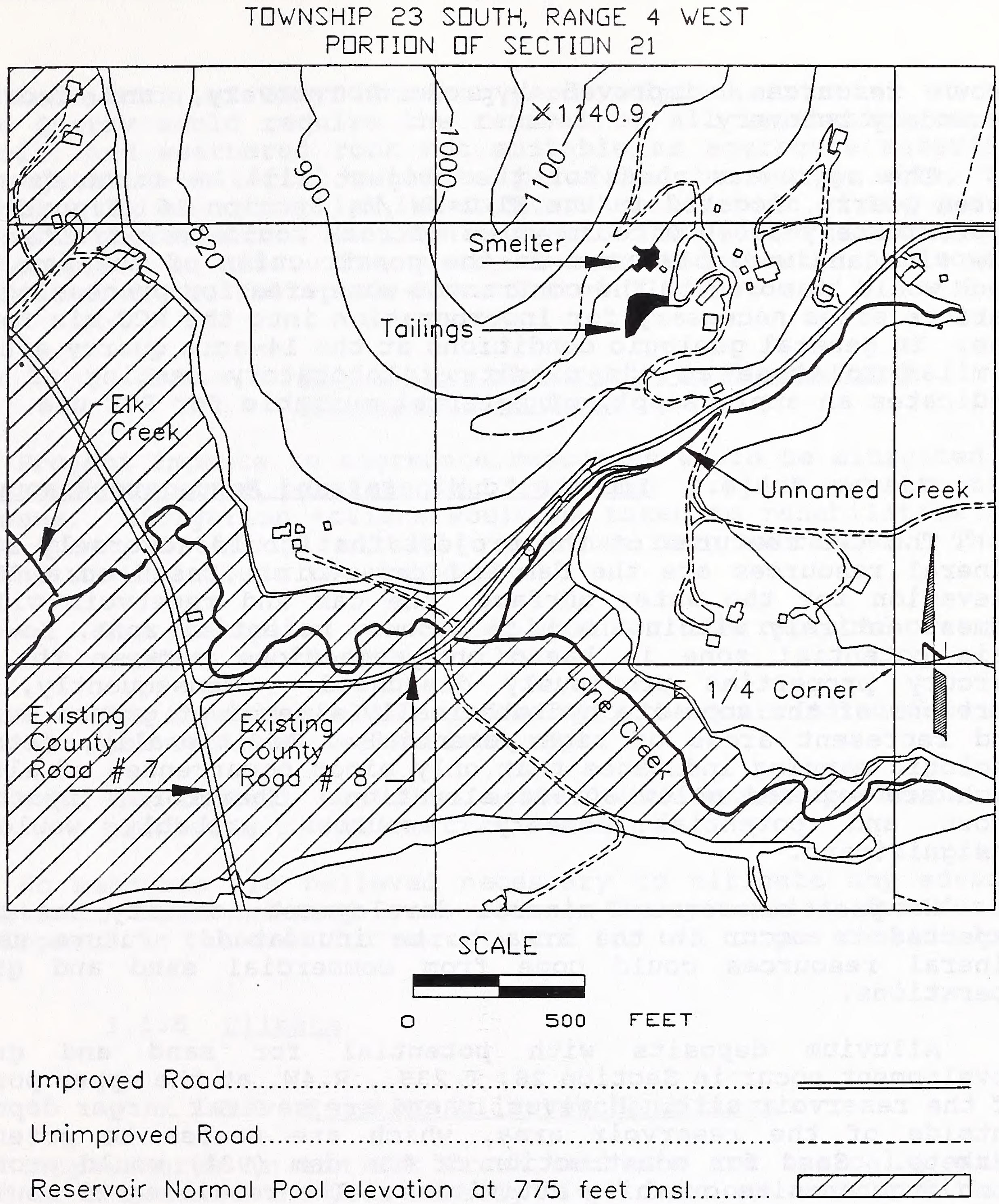


FIGURE 3-4-3
MILLTOWN HILL PROJECT
LOCATION OF ELKHEAD MINE

Source: Douglas County Public Works Department known resources, improved byproduct recovery, and increased secondary recovery.

The aggregate needs of the project will be taken from the Otten Quarry, located in the E1/2 NW1/4, Section 16 (Figure 2-2). Approximately 300,000 cubic yards of rock would be extracted from the site and would be used in the construction of the dam. The rock would be moved to the contractor work area for processing into various sizes necessary for incorporation into the RCC mix for the dam. In general geologic conditions at the 14-acre quarry site are similar to those at the damsite. Laboratory testing of cores indicates an ample supply of material suitable for RCC use.

3.1.4.2 Impacts to Mineral and Aggregate Resources

The two features of the project that could adversely affect mineral resources are the dam and reservoir. Based on a 775 ft elevation for the water surface, the dam and reservoir will be almost entirely within the high mercury potential zone. However, this potential zone is based on projections between the four mercury properties previously discussed. Consequently, only portions of the zone are hydrothermally altered at ground surface and represent areas of high potential. Additionally, detailed geologic mapping indicates that only minor occurrences of altered rock are exposed below 800-ft elevation. Therefore, impacts on known and potential mercury resources probably would be insignificant.

No past or current mineral development activity has or is expected to occur in the area to be inundated. Future use of mineral resources could come from commercial sand and gravel operations.

Alluvium deposits with potential for sand and gravel development occur in Section 28, T.23S., R.4W. at the upper portion of the reservoir site. However, there are several larger deposits outside of the reservoir area, which are nearer to potential markets. Sand for construction of the dam (98%) would probably come from on-site crushing activities. The remaining 2% would be transported to the site from commercial quarries.

No potential oil and gas resources would be significantly affected by the project, since most of the reservoir area would inundate a portion of the Umpqua formation, which has been determined to have low potential for this resource.

If mining of the Elkhead deposit were to become economically feasible in the future because of increased mercury prices and/or improved mining methods, restrictions for extracting and processing the ore would most likely be in the form of increased stringent water quality standards enforced by the state of Oregon.

Extraction of 300,000 cubic yards of rock material at the Otten Quarry would require the removal of all vegetative cover, topsoil, and weathered rock not suitable as aggregate material. All vegetative material would be piled and burned on site, the topsoil would be stockpiled, used for rehabilitation of the quarry after all suitable rock has been removed. The weathered rock would be stockpiled on site. The quarry is situated about a horizontal 200 feet from the full-pool elevation of 775 feet msl.

3.1.4.3 Mitigation of Impacts to Mineral and Aggregate Resources

Project impacts to aggregate resources would be mitigated by using on-site sand, gravel, and rock for project construction purposes. Mitigation actions would be taken to rehabilitate the Otten Quarry after all suitable rock has been extracted. These actions would include the following:

- The stockpiled, weathered rock would be replaced over the surface of the quarry floor.
- The topsoil would be spread over the quarried surface and the replaced weatherized rock.
- The topsoil would be seeded with grasses, shrubs and planted with native tree seedlings.

No measures are believed necessary to mitigate any adverse impacts to other mineral resources. The potential for future development in the area for mercury and for oil or gas remains low.

3.1.5 Climate

3.1.5.1 Existing Climatic Conditions

Temperatures in the Elk Creek subbasin are typically mild. The four seasons of the year usually blend into one another without abrupt changes. The average, maximum and minimum temperature, precipitation and snow for 1949-1986 are shown below (Douglas County Water Resources Survey, 1990):

	AVERAGE ANNUAL	MAXIMUM YEAR	MINIMUM YEAR
Temperature (F)			
Drain	53.0	107.0	0
Elkton	54.5	108.0	6
Precipitation (inches)			
Drain	48.4	64.3	32.1
Elkton	54.4	74.1	34.8
Snow (inches)			
Drain	3.25	23.20	0
Elkton	6.14	41.50	0

Extreme temperatures are uncommon due to the proximity of the subbasin to the Pacific Ocean. Occasionally in midwinter, a dry polar continental air mass invades the area for a short duration bringing freezing temperatures into the subbasin. In a normal winter, there are about 41 days in which the temperature falls below the freezing point. Temperatures of 90 degrees are exceeded about 20 days of the year.

Rainfall data has been collected continuously at both the Drain and Elkton gages since the fall of 1948. Average annual precipitation is about 10% higher at Elkton than at Drain. Due to the relatively low elevations in the area, snowfall in the subbasin melts rapidly. For the Drain gage, an average of 3.25 inches of snow falls in a year, while at the Elkton gage, an average of 6.14 inches falls in a year. The average precipitation (inches) at Elkton for 1949-1986 is as follows:

JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
9.94	7.03	6.56	3.50	1.99	0.96	0.41	0.64	1.39	4.15	7.60	10.55	54.52

Source: Bureau of Reclamation, 1991.

Although annual precipitation is relatively high, only about 20 percent or about 9 inches occurs during the growing season (June through August). An isohytal analysis (Hill, 1971) estimated the average watershed precipitation at 57.6 inches.

Flood-producing storms occur mainly in the winter and occasionally in late fall and early spring. The typical winter storm results from the southward displacement of the Aleutian low pressure area accompanying frontal systems. Storms usually originate over the northwest Pacific Ocean, so accompanying air masses have a long trajectory over relatively warm water and acquire a high moisture charge. A series of waves at times forms within the low pressure area and, moving eastward, cause widespread precipitation over much of the west coast of the United States. General storms of this nature, augmented by orographic lifting of the moisture laden maritime air by the Coast Range, cause nearly all the flood-producing storms in the area (Bureau of Reclamation, 1991).

Data on wind speed and direction is available at the Roseburg airport. On the average, wind velocity at Roseburg is 4.9 miles per hour with a prevailing direction of north to northwesterly. The prevailing direction varies with the season, being from the south and west during the winter months and from the north and west during the rest of the year. The highest wind gust recorded at the Eugene, Oregon, station (located approximately 70 miles north of the project area) was 86 miles per hour on October 12, 1962, with sustained winds of 63 miles per hour.

The growing season is the duration of time between the last freeze of the spring (32 degrees F) and the first freeze of the fall (32 degrees F). Based on the period of 1949 to 1986 at the Elkton gage, the last freeze of the spring will occur on April 4, and the first freeze of the fall will occur on November 7. This results in a growing season of 217 days. Some grass and legume crops are more tolerant of freezing, so a growing season based on a 28 degree F temperature was also developed. The 28 degree F temperature extends from February 12 to December 6 (296 days) on the average. For less tolerant crops a 36 degree F growing season was also computed. The 36 degree F growing season extends from May 5 to October 17 (164 days). The growing season, based on 32 degrees F at the Elkton gage, has varied from 149 days in 1970 to 310 days in 1979 (Bureau of Reclamation, 1991).

3.1.5.2 Impacts on Climate

The project would not affect climatic conditions, however, climate could affect project operation. Critical high air temperatures and/or low water years would affect the drawdown rate to maintain downstream water temperatures needed for the enhancement of anadromous fish habitat (See: Section 3.1.15, Fisheries Resources). Low water years and resulting low water storage could affect other project needs, such as irrigation, and municipal and industrial uses.

3.1.5.3 Mitigation

No mitigation is planned because no impacts are anticipated.

3.1.6 Air Quality

3.1.6.1 Existing Air Quality

The proposed project is within the Southwest Oregon Air Quality Control Region (Bureau of Reclamation, 1991). Both the Federal government and the State of Oregon have developed standards for allowable levels of certain pollutants. Certain areas have been designated in the Clean Air Act as areas for the prevention of significant deterioration (PSD). The project area is entirely within areas designated as Class II (moderate degradation allowed). The nearest Class I areas (virtually no degradation allowed) are Diamond Peak Wilderness, and Crater Lake National Park, about 60 miles and 80 miles from the project site, respectively.

Pollutants in northern Douglas County are caused primarily by exhausts from home heating, vehicular traffic, and timber operations. Only timber operations have significant effect, and then only when considerable amounts of logging slash are burned. Because of the intermittent and spotty nature of slash burning, its effects are relatively brief, (usually 2 to 3 weeks after the first heavy rainfall in the fall, and 2 to 3 weeks in the spring).

3.1.6.2 Impacts to Air Quality

3.1.6.2.1 Construction

The construction phase of the project would produce short-term adverse impacts on local air quality. These would result from exhaust pollutants generated by construction vehicles and equipment both at the site and during transit of materials from the quarry. The effect of these vehicular emissions on ambient air in the well-ventilated, unconfined airsheds would be slight and well within allowable limits.

Impacts would also be caused from fugitive dust, both at the construction site, along the access road, and during rock excavation and crushing. These impacts would be temporary and of little overall significance. Annoyance to residents living along access routes to the project site can be expected. Air quality impacts during the construction phase of a project are exempt from Oregon air quality standards (Oregon Administrative Rules 340-31-150).

3.1.6.2.2 Operation

Operation of the dam is not expected to have an adverse impact on air quality. Exhaust and dust from recreational vehicles and recreational activities would not be significant.

3.1.6.3 Mitigation of Air Quality Impacts

Construction specifications would require the contractor to comply with applicable Federal, State, and local air quality standards and emission limitations adopted in accordance with or effective under the provisions of the Clean Air Act (Public Law 91-604), as amended by the Clean Air Amendments of 1977 (Public Law 95-95). During construction, the contractor would be required to use such methods and devices as reasonably available to control, prevent, and otherwise minimize atmospheric emissions or discharges of atmospheric contaminants and gases.

The emission of excessive dust into the air would not be permitted during the manufacture, handling, and storage of concrete aggregates. The contractor would be required to use such methods and equipment as are necessary for collection, disposal, or prevention of dust during these operations. Rubbish, trash, and other combustible materials (except for cleared trees and brush) would be disposed of in an approved sanitary landfill. Cleared vegetation would be burned onsite or be anchored and submerged for fish cover.

The contractor would be required to carry out measures to reduce dust and to prevent dust caused by his operations from damaging dwellings or causing a nuisance. This would include the periodic wetting of exposed soils, especially on the contractor haul road.

Long-term stabilization would be achieved by revegetating exposed areas. The planned use of overburden removed from the abutments and quarry would minimize hauling distance and avoid exposing residences to dust from trucks carrying material.

3.1.7 Noise

3.1.7.1 Existing Noise Conditions

Existing noise sources of significance include occasional log trucks, automobile traffic, and infrequent noise from agricultural and timber operations. Ambient noise levels have not been measured at the reservoir pool area. They can be assumed to approximate general values obtained for sites with similar characteristics. The only significant noise in the area now is the sound of water in Elk Creek, periodic traffic on County roads, and occasional human activity, including logging. Typical ambient noise levels for rural environments range between 32 and 40 decibels (dB). Existing ambient L10 noise levels, which reflect sound from all sources, should be less than 50 dBA. (L10 is the sound pressure level exceeded only 10 percent of the time; "dBA" is an "A scale" weighing of sound in decibels. One decibel corresponds to the smallest change in sound that can be detected by the ear. The "A scale" weighing approximates the loudness as heard by the human ear.) For comparison, 60 dBA represents the average sound level of normal conversation (Bureau of Reclamation, 1991).

3.1.7.2 Noise Impacts

3.1.7.2.1 Construction

Construction activities in the reservoir pool area would cause increased noise levels. Typically, the sounds of chainsaws and logging equipment during reservoir clearing, earthmovers, bulldozers, dump trucks, wagon drills during excavations at the damsite and at the Otten Quarry, punctured by occasional blasting, can be expected during the 4 year construction period. Increased road traffic and accompanying higher sound levels would be experienced by residents living near County roads #7 and #8. Most of the increased noise levels would not exceed 90-95 dBA, and would occur during daylight hours only.

The construction of the pipeline in the service area would result in some minor, short-term increase in noise levels during daylight hours.

3.1.7.2.2 Operation

Motorboating would be the greatest noise source during operation of the project. Boating would be concentrated in the center pool area, since a barrier would be placed across the narrower neck of the pool at the upper end. Boat access would not be permitted in the wildlife area.

3.1.7.3 Mitigation of Noise Impacts

Construction specification would require the contractor to comply with the Noise Control Act of 1972 (Public Law 92-574) as amended by the Quiet Communities Act of 1978 (H.R.12647). Boating noise impacts would be minimal because not many people would be living near the reservoir.

3.1.8 Surface Water Quantity

3.1.8.1 Existing Surface Water Quantity

Surface water flows in Elk Creek subbasin are unregulated except during the irrigation season, when minimum flows are enforced. Low elevations and mild winters result in little snowfall but abundant rainfall during the winter and spring months. The pattern of stream flow follows the precipitation pattern with high flows in winter and spring and very low flows in summer (Douglas County Water Resources Survey, 1990).

Recorded flow extremes at the Elk Creek gage near Drain, range from a minimum daily flow of 0.0 cubic feet per second (cfs) to a maximum instantaneous flow of 19,000 cfs. This peak flow occurred on February 10, 1961. Summer flows at the gage fall below 10 cfs frequently. The mean annual flow for the period of record (1956-1989 water years) is 209 cfs. The average annual runoff volume is 151,700 acre-feet while the smallest runoff occurred in year 1977 with 26,300 acre-feet and the largest in year 1956 with 293,400 acre-feet. Average monthly flows for the 1956-1989 period are shown on Table 3-8-1 (Douglas County Water Resources Survey, 1990).

Current water use and availability during April through October in Elk Creek subbasin are graphically summarized in Figure 3-8-1. The average flow represents the amount of stream flow that has occurred in 4 out of 5 years, based on USGS/Douglas County records for the cited gage. The horizontal "stair-step" lines represent the legal limit of diversions for all purposes. The lines delineate the chronology of important events in water resource management that have occurred in Elk Creek. Water rights acquired prior to 1974 are shown as the lower band for each month. The next band includes the minimum flow established in 1974 and the pre-1974 rights. Rights acquired after 1974 (through 1987) are also shown. Minimum flows were established in Elk Creek subbasin in 1974 and were converted to instream water rights in 1989, with their appropriate priority date (Myers, 1989).

Table 3-8-1. Elk Creek Average Monthly Water
Flows at Gage # 14-3220.00
Near Drain, Oregon (1956-1989).

Month	Mean cfs	Maximum cfs	Minimum cfs	Average Runoff (Acre-Feet)
October	18.0	99.4	1.4	1,110
November	241.2	1019	8.3	14,350
December	536.0	1869	9.5	32,960
January	540.1	1212	15.5	33,210
February	483.7	1375	36.7	27,100
March	374.1	807	83.2	23,000
April	192.9	649	47.1	11,480
May	97.1	361	17.5	5,970
June	28.7	66.2	6.7	1,710
July	7.2	19.7	0.8	440
August	2.5	11.7	0.1	150
September	4.0	15.0	0.4	240
Annual	209	---	---	151,720

Source: Douglas County Water Resources Survey, 1990.

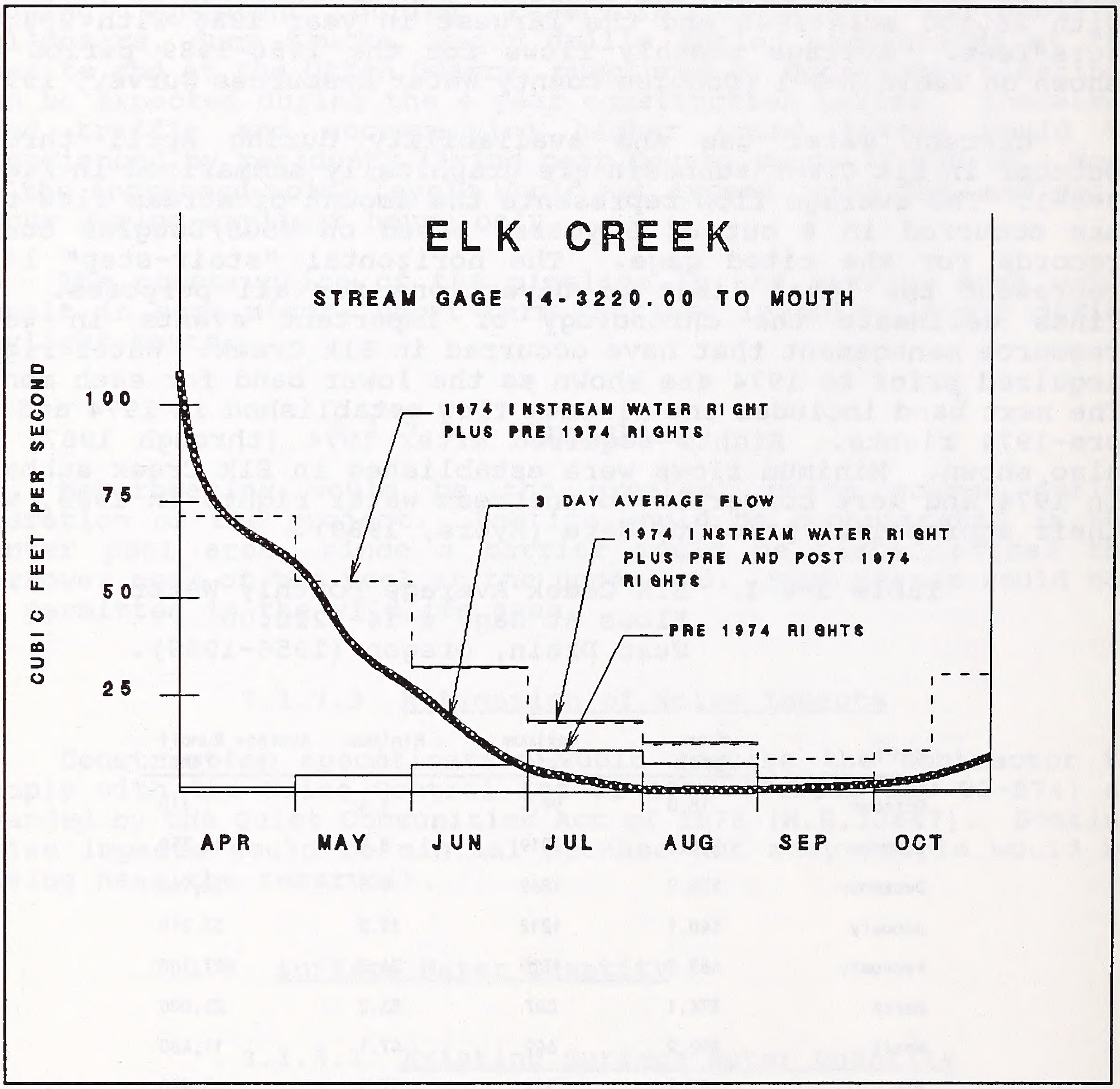


Figure 3-8-1. Comparison of Average Flow and Water Rights (Myers, 1991). Water Years 1965 - 1984.

Flow rates in Elk Creek are inadequate to meet instream water rights established in 1974 and rights acquired thereafter, from mid-April through October in most years (Figure 3-8-1). Pre-1974 rights are not met between July and October for most years. Flows decrease to nearly zero in July and do not recover until after mid-September. Thus, all water uses are curtailed in Elk Creek nearly every summer. As stream flows decrease to amounts less than necessary to meet all water rights, the Watermaster administers the stream under the prior rights doctrine. In the case of irrigation water rights, diversions under the most recent rights are stopped. In the case of municipal rights, when junior to instream water rights, diversions are reduced to equal the "human consumption" or domestic component of the right. Domestic rights and stockwater would be allowed to continue diversion if water is available (Myers, 1989).

The lack of flood control structures on Elk Creek has resulted in high streamflows that damage both urban and rural property. Floodflows in the Elk Creek subbasin most often occur from November through March, usually after heavy winter rains. In some years, low elevation snowmelt accompanying a rainstorm may increase the flooding. The largest flood of record, estimated to be greater than a 50-year recurrence interval flood, occurred on February 10, 1961, when a maximum instantaneous flow of 19,000 ft^3/s was recorded on Elk Creek downstream of its confluence with Yoncalla Creek (Douglas County Water Resources Survey, 1990).

Property damage from flooding tends to be concentrated in the city of Drain where industrial, commercial, public, and residential developments are located on the Elk Creek and Pass Creek flood plains. During high flow periods, backflows from Elk Creek enter the lower reaches of Pass Creek and exacerbate flood damages near their confluence. Damages to agricultural lands and woodlots occur in the rural areas both upstream and downstream of Drain. Bridges in Drain and in the outlying areas are subject to damage from high floodflows.

In 1979, the Federal Insurance Administration, Department of Housing and Urban Development completed a flood insurance study for the city of Drain and identified a flood frequency analysis to determine the flood discharges for Elk and Pass Creeks. The summary of the results from that study is shown in Table 3-8-2.

Table 3-8-2. Flood Frequency and Summary of Discharges for Elk Creek Near Drain.

Flooding source and location	Drainage area (sq mi)	Peak discharges (ft^3/s)				
		2-year	10-year	50-year	100-year	500-year
Elk Creek above Pass Creek	105	5,950	12,000	18,500	21,100	28,600
Elk Creek below Pass Creek	168	8,240	17,000	26,000	30,400	41,600

Source: Federal Insurance Administration, 1979.

Studies performed by the County and the U.S. Army Corps of Engineers estimated flood damages that are anticipated without the project for each size flood. The results of these studies are summarized in Table 3-8-3. Based on these studies, average annual flood damages in the Elk Creek subbasin are $205,000. The distribution of these annualized damages is shown in Table 3-8-4 (Bureau of Reclamation, 1991).

Table 3-8-3. Flood Damage Summary, Elk Creek.

Flood size[1]	Amount[2]
2-year	--
10-year	$ 405,000
50-year	1,065,000
100-year	1,479,000
500-year	2,969,000

---

[1] Recurrence interval of flood.
[2] Total damages anticipated from flood based on current level of development.

Table 3-8-4. Average Annual Flood Damages Along Elk Creek[1].

Damage classification	Value
Woodlot and pasture	$74,545
Bridges	81,038
Residential	36,875
Commercial	5,089
Public buildings	3,305
Industrial	4,170
Total	$205,022

---

[1] Annualized damages based on projected recurrences of 2-, 10-, 50-, 100-, and 500-year flood events.

3.1.8.2 Impacts to Surface Water Quantity

3.1.8.2.1 Construction

Water quantity would not be affected during construction of the project. All present statutory requirements would be met.

3.1.8.2.2 Operation

Operation of the Milltown Hill Dam and reservoir would change the flow regime of Elk Creek dramatically below the dam. Water quantities would remain unchanged. Excess winter flows, those flows not needed to meet instream flow requirements, would be stored in the reservoir for release later in the year to meet downstream needs for fisheries resources, irrigation, municipal, and industrial demands.

A comparison of the average monthly flows below the dam, at Drain, and at the mouth for both pre- and post-project conditions are shown in Figures 3-8-2, 3-8-3, and 3-8-4. Project Flows are consistently higher than pre-project flows at all 3 locations for low flow months. Flows for water years 1957-58 (average water year) and 1977-78 (low water year) are shown in Tables 3-8-5 and 3-8-6. The flows show the existing condition for the summer months in comparison to the project flows. An additional fish flow is also shown and arbitrarily distributed according to the acre-feet available for fisheries resources for those years.

The acre-feet available for enhancement of fisheries resources would vary from year-to-year depending on water year and downstream demands. In these examples, 6,280 and 1,922 acre-feet would have been available in 1957 and in 1977, respectively. Figure 3-8-5 shows exceedence for the storage release for fish. Although the storage allocation for fish is 7,737, about 50% of the time storage would have exceeded 7,000 acre-feet, while 90% of the time it would have exceeded 5,000 acre-feet, depending on water year (Douglas County Water Resources Survey, 1990).

Flow duration curves of the July-September period for both pre- and post-project conditions at the dam, Boswell Springs (river mile 26.5), and mouth are shown in Figures 3-8-6, 3-8-7 and 3-8-8. Under the post-project condition, a target flow of 5 cfs at the dam is met 100 percent of the time. A target flow of 45 cfs at Boswell Springs is met 95 percent of the time, and a target flow of 15 cfs is met 98 percent of the time at the mouth. The post-project conditions show a significant improvement in instream flows during critical flow periods (Douglas County Water Resources Survey, 1990).

The presence of the project would reduce the overbank flows by about 1 foot in Drain (K. Shumway, pers. comm., Douglas County). This would decrease flood damages.

The irrigation of croplands requires the even dispersion of water to the crops. A minor amount of this water would be lost through evapo-transpiration processes. A major amount of the irrigation water would be absorbed by the soil and become ground water. The increased amount of ground water, as a result of irrigation, would move through the soil and the excess would be deposited in the subsurface drainage system and returned to Elk Creek. Table 3-8-7 shows the cumulative monthly irrigation return flows for a normal year near Drain and at the mouth of Elk Creek in comparison to the average flow in Elk Creek. Return flows are not

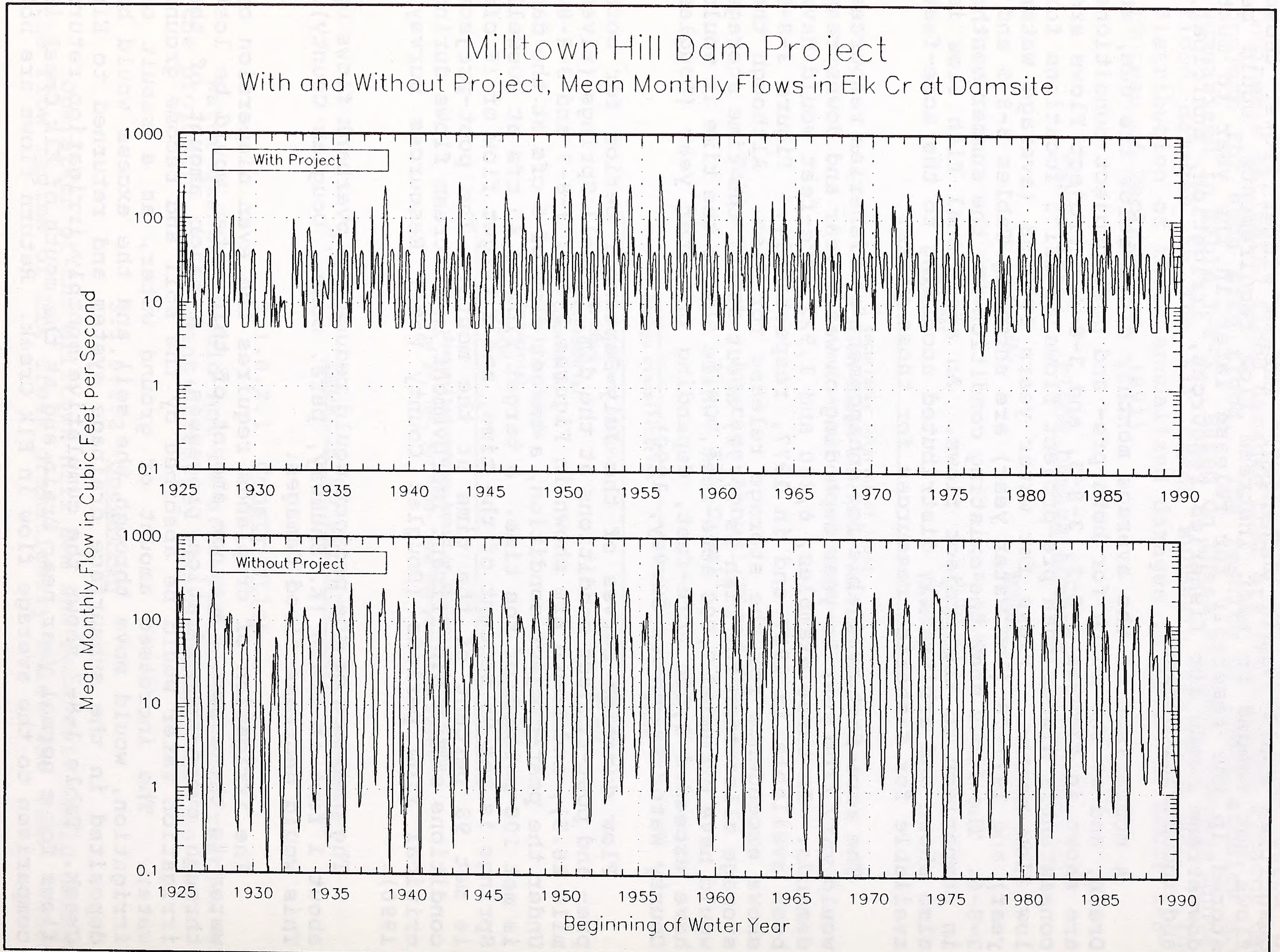


Figure 3-8-2: Natural and Regulated Flows at the Damsite (Douglas County Water Resources Survey, 1990).

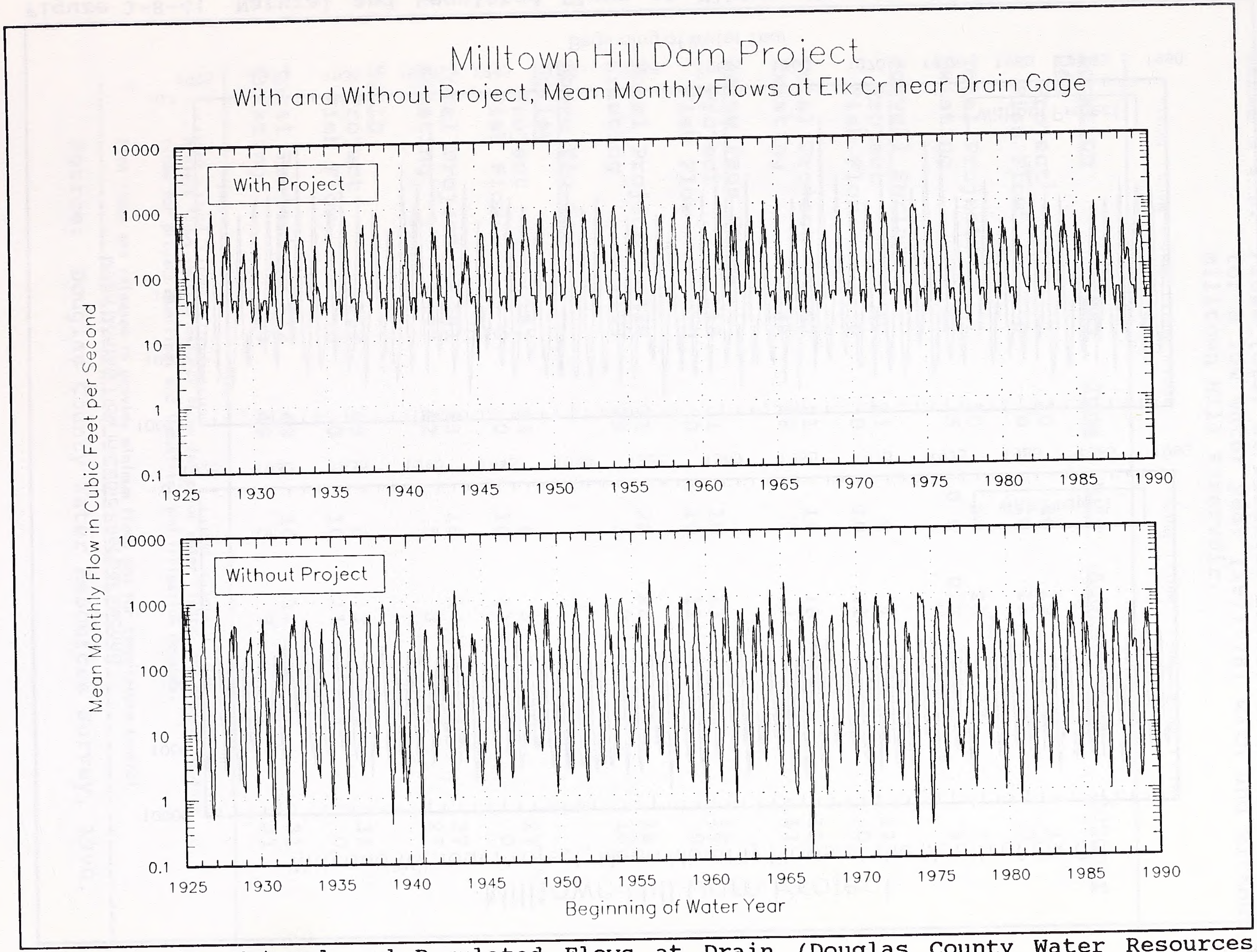


Figure 3-8-3: Natural and Regulated Flows at Drain (Douglas County Water Resources Survey, 1990).

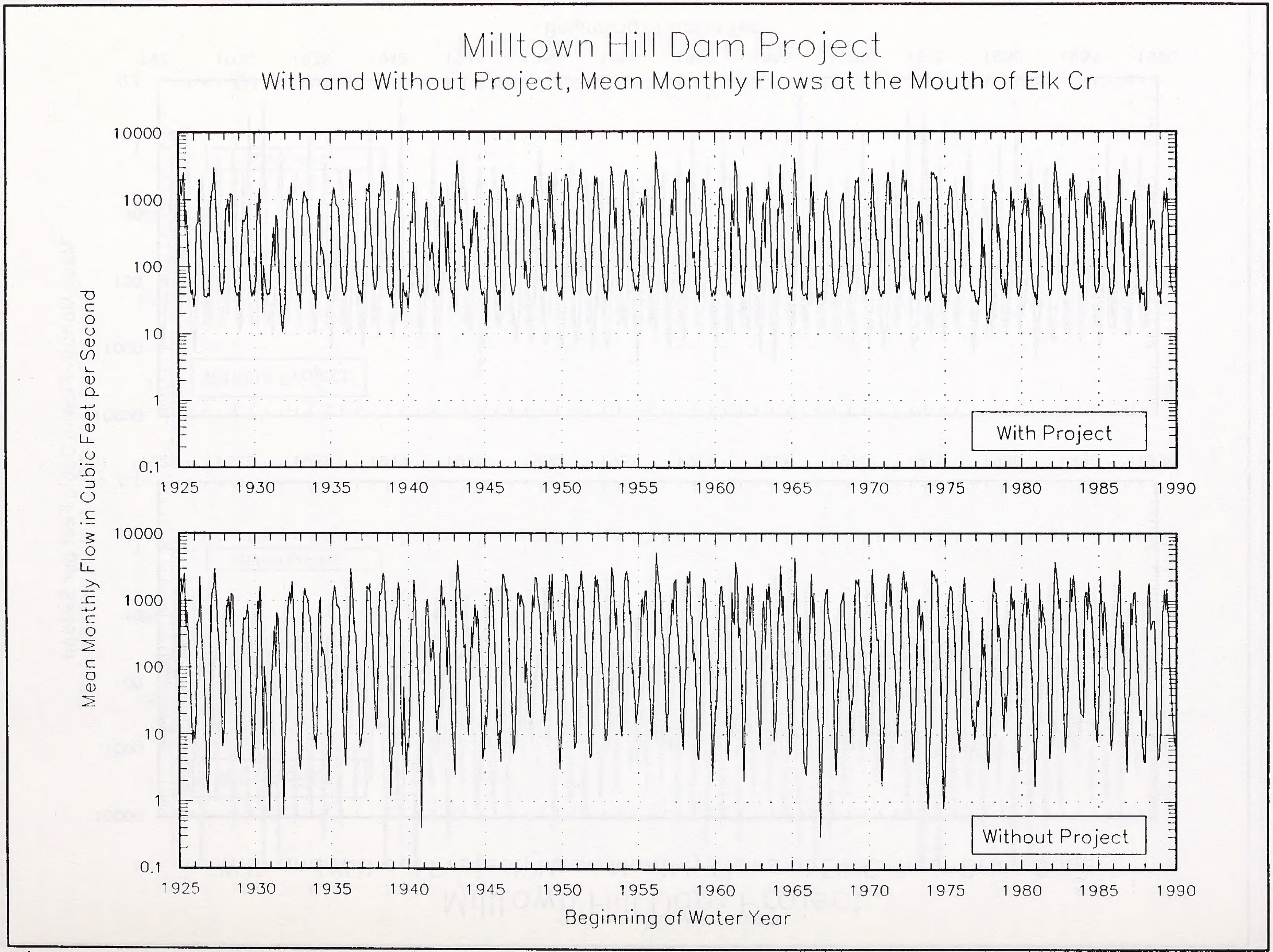


Figure 3-8-4: Natural and Regulated Flows at Elkton (Douglas County Water Resources Survey, 1990).

Table 3-8-5. Flows (cfs) at selected locations in Elk Creek for a low water year (1977-78) with and without Milltown Hill Reservoir.

Location	May	June	July	August	Sept	October
Dam						
Project[1]	7	10	10	10	6	3
Fish Flow[2]	0	0	10	11	11	0
Total Project	7	10	20	21	17	3
Existing	22	5	0.5	0.3	1	3
Boswell Springs						
Project	67	21	8	7	7	12
Fish Flow	0	0	10	11	11	0
Total Project	67	21	18	18	18	12
Existing	82	18	2	1	4	11
Below Pass Creek						
Project	118	31	18	17	19	18
Fish Flow	0	0	10	11	11	0
Total Project	118	31	28	28	30	18
Existing	133	29	3	2	7	18
Above Big Tom Folley						
Project	181	43	6	3	10	27
Fish Flow	0	0	10	11	11	0
Total Project	181	43	16	14	21	27
Existing	197	42	5	3	10	27
Mouth						
Project	212	49	6	3	11	31
Fish Flow	0	0	10	11	11	0
Total Project	212	49	16	14	22	31
Existing	229	49	5	3	11	31

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[1] Project flows include natural flows for prior water rights, and project storage flows for project municipal and industrial and irrigation demands.

[2] Fish flows are released to provide minimum flows and for temperature control.

Source: Douglas County Water Resources Survey, 1990.

Table 3-8-6. Flows (cfs) at selected locations in Elk Creek for an average water year (1957-58) with and without Milltown Hill Reservoir. Flows rounded to nearest integer.

Location	May	June	July	August	Sept	October
Dam						
Project[1]	10	14	19	20	11	4
Fish Flow[2]	0	0	25	26	32	5
Total Project	10	14	44	46	43	9
Existing	25	9	2	1	1	4
Boswell Springs						
Project	78	38	16	15	8	15
Fish Flow	0	0	29	30	37	8
Total Project	78	38	45	45	45	23
Existing	94	34	6	4	2	15
Below Pass Creek						
Project	137	58	18	15	8	23
Fish Flow	0	0	29	30	37	8
Total Project	137	58	47	45	45	31
Existing	153	54	9	6	3	24
Above Big Tom Folley						
Project	208	81	15	10	6	35
Fish Flow	0	0	29	30	37	8
Total Project	208	81	44	40	43	43
Existing	227	81	14	8	5	35
Mouth						
Project	244	93	16	10	6	40
Fish Flow	0	0	29	30	37	8
Total Project	244	93	45	40	43	48
Existing	263	93	16	10	6	41

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[1] Project flows include natural flows for prior water rights, and project storage flows for project municipal and industrial and irrigation demands.

[2] Fish flows are released to provide minimum flows and for temperature control.

Source: Douglas County Water Resources Survey, 1990.

included in the average flow for Elk Creek.

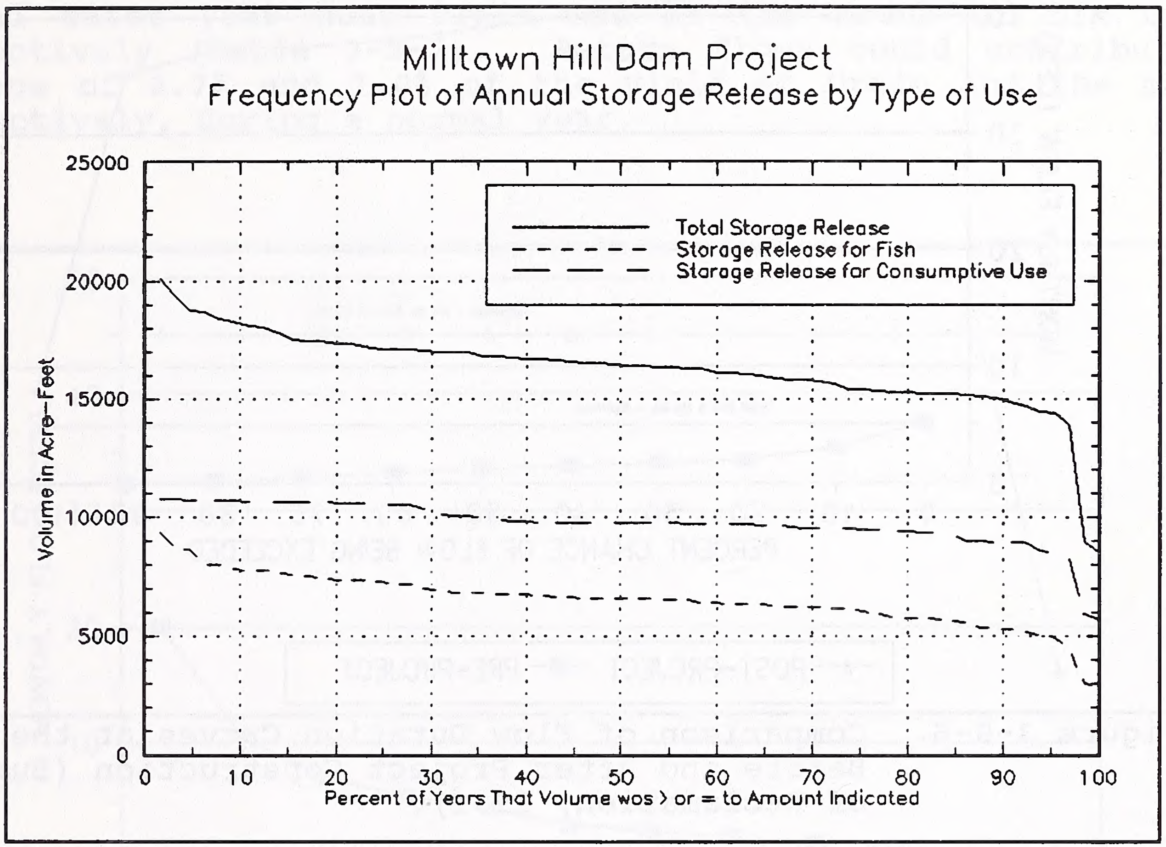

Figure 3-8-5. Storage exceedence curves for total storage, fish storage, and consumptive use (Douglas County Water Resources Survey, 1990).

Table 3-8-7. Cumulative Irrigation Return Flow and Average flow (cfs) in Elk Creek at the Stream Gage Near Drain (14-3220.00 and at the Mouth of Elk Creek.

Location	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total (ac-ft)
Return Flow Near Drain	0.008	0.50	2.16	4.37	6.28	6.05	3.25	0.82	0.04	1,426
Average Flow	192	87	38	44	44	44	28	180	384	52,826
Return Flow At Mouth	0.01	0.62	2.65	5.43	7.94	7.72	4.12	1.01	0.04	1,793
Average Flow	545	253	88	47	37	45	65	601	1,236	176,821

Source: Douglas County Water Resources Survey, 1991.

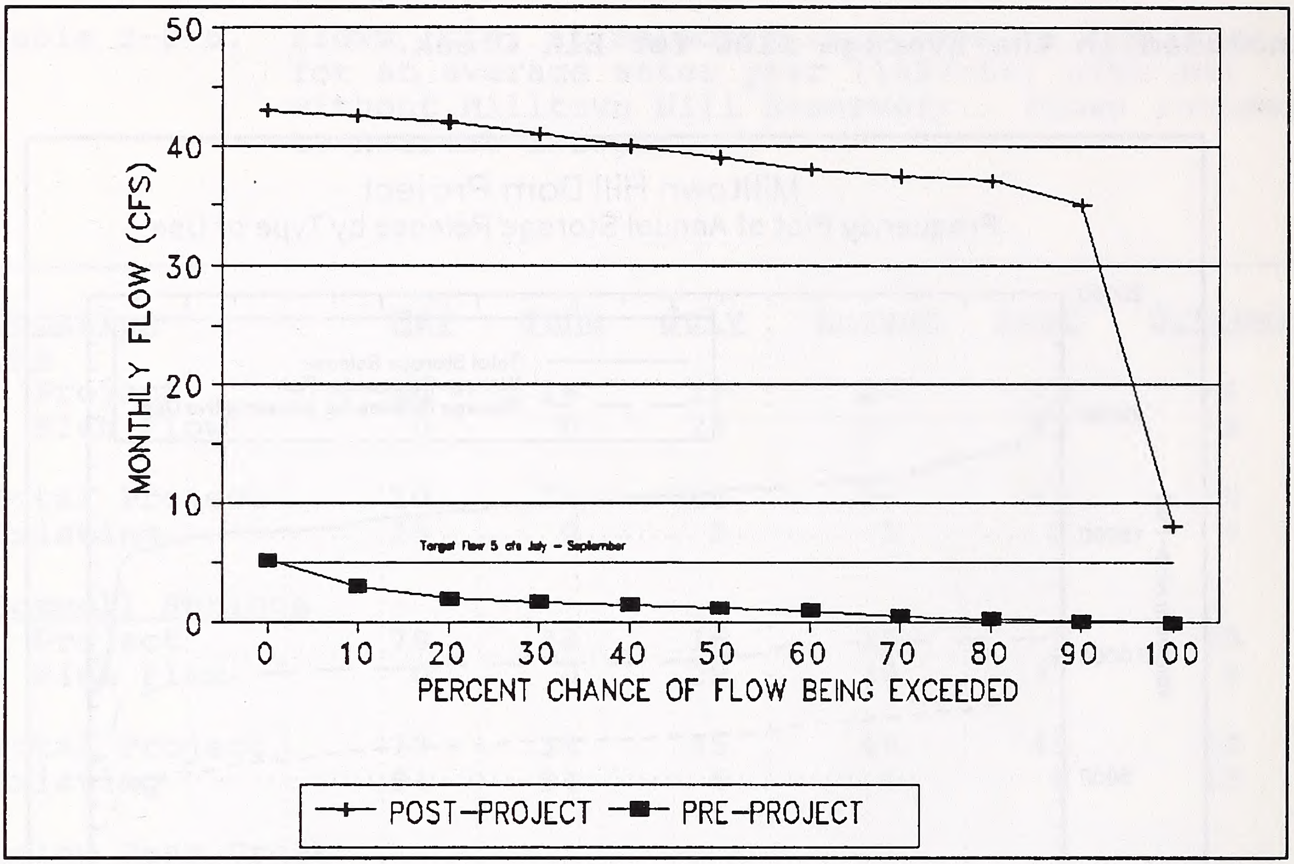

Figure 3-8-6. Comparison of Flow Duration Curves at the Dam Before and After Project Construction (Bureau of Reclamation, 1991).

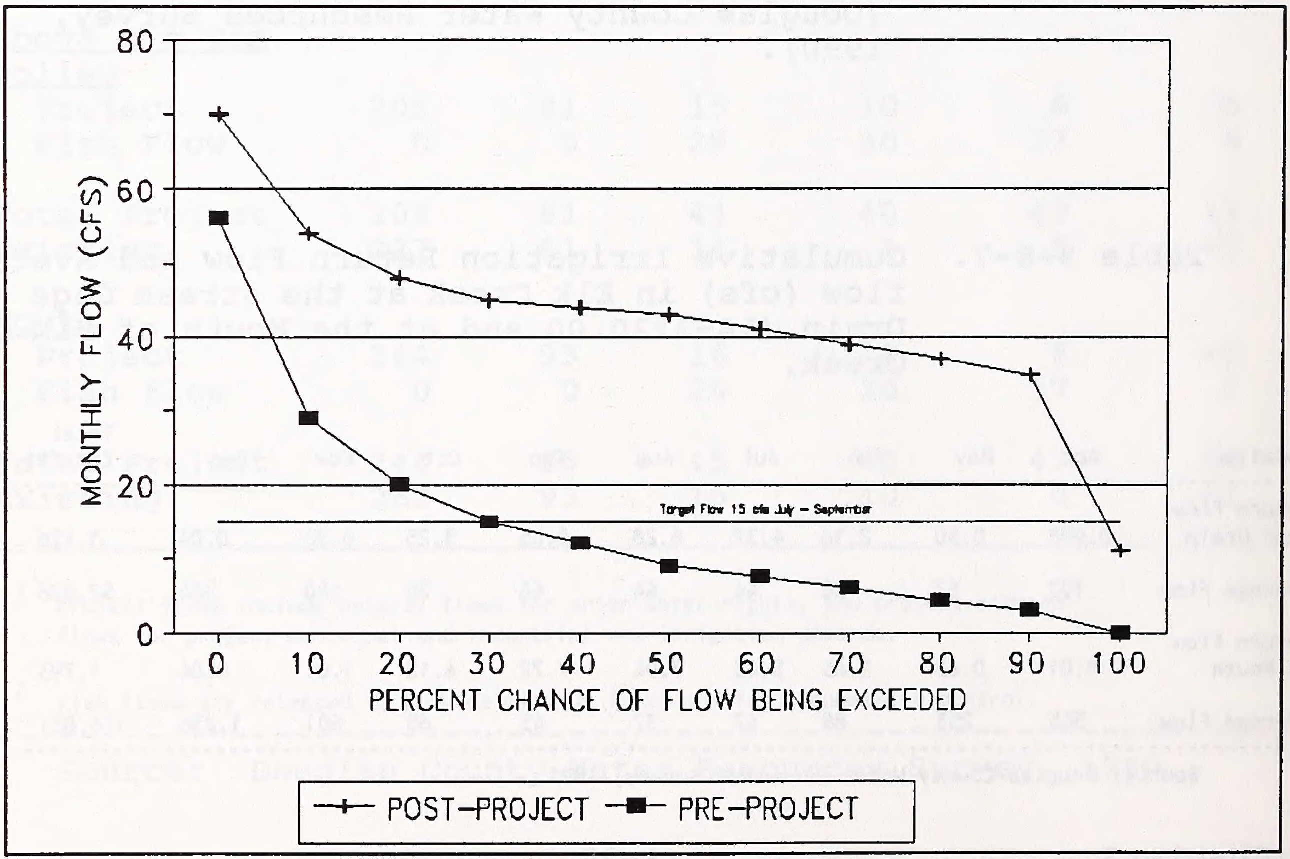

Figure 3-8-7. Comparison of Flow Duration Curves at the Mouth of Elk Creek Before and After Project Construction (Bureau of Reclamation, 1991).

The impact of irrigation return flows to Elk Creek are expected to be minimal. Return flows could contribute up to about 12% and 18% additional monthly flow during the late summer of a normal water year near Drain and at the mouth of Elk Creek, respectively (Table 3-8-7). Return flows could contribute an average of 2.7% and 1.0% of the yield at Drain and the mouth, respectively, during a normal year.

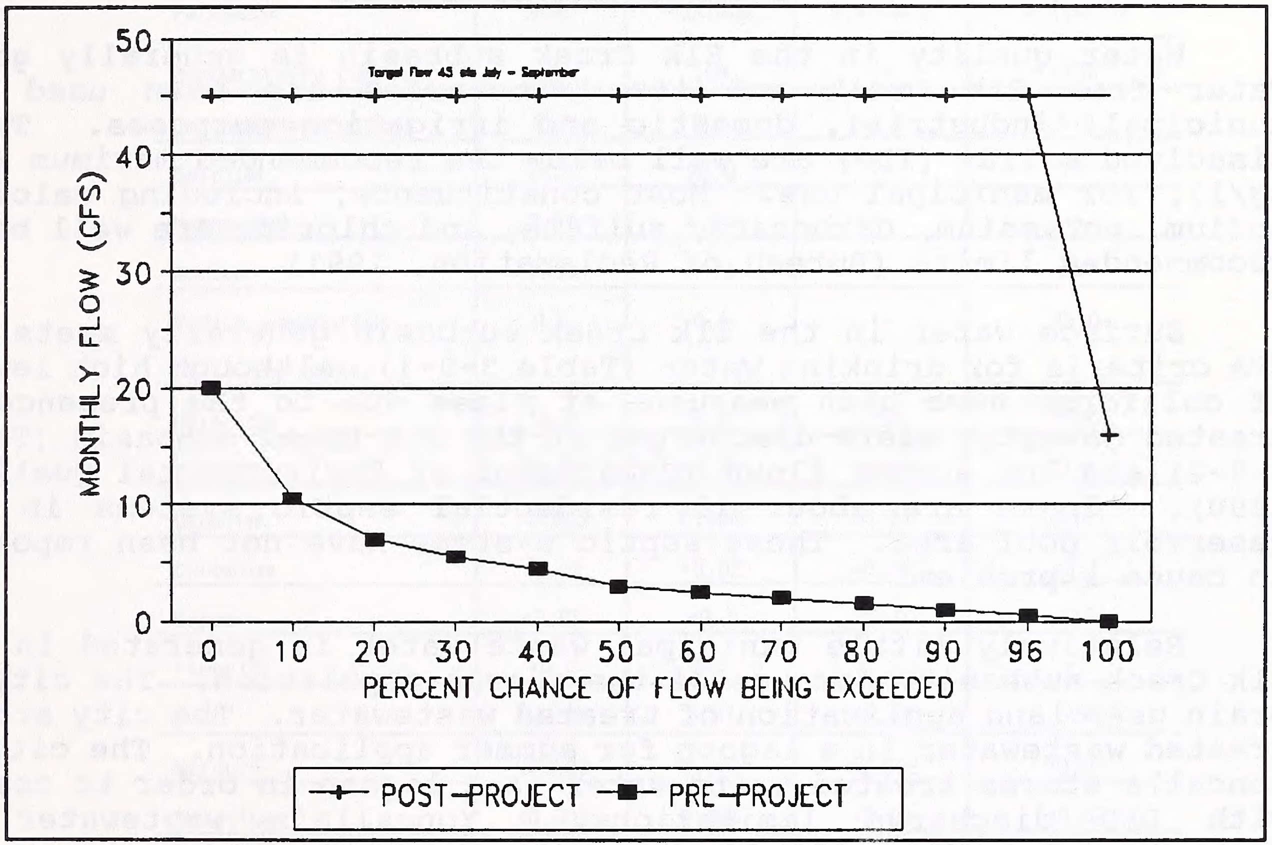

Figure 3-8-8. Comparison of Flow Duration Curves at Boswell Springs (Bureau of Reclamation, 1991).

3.1.8.3 Mitigation of Impacts to Surface Water Quantity

The stream regulation provided by the project would favorably affect downstream uses, including those for irrigation, municipal, flood control, and industrial. The impact on fisheries resources would be beneficial by increasing the productivity of Elk Creek because of higher summer flows and lower summer water temperatures. No adverse impacts have been identified at this time that require mitigation however, Douglas County has sized the reservoir to allow up to 7,737 acre-feet of water to be stored to provide flows (in addition to project flows) and water temperature control downstream of the dam for fisheries resources. A plan for the release of the stored water would be developed between County and fish and wildlife agencies. The use of this stored water is discussed in Section 3.1.15, Fisheries Resources.

3.1.9 Surface Water Quality

3.1.9.1 Existing Water Quality

Water quality in the Elk Creek subbasin is generally good. Water from Elk Creek and its tributaries has been used for municipal, industrial, domestic and irrigation purposes. Total dissolved solids (TDS) are well below the recommended maximum (500 mg/l), for municipal use. Most constituents, including calcium, sodium, potassium, carbonate, sulfate, and chloride are well below recommended limits (Bureau of Reclamation, 1991).

Surface water in the Elk Creek subbasin generally meets the EPA criteria for drinking water (Table 3-9-1), although high levels of coliforms have been measured at times due to the presence of treated domestic waste discharges in the Elk Creek subbasin (Table 3-9-2) and low summer flows (Department of Environmental Quality, 1990). There are about 10 residential septic systems in the reservoir pool area. These septic systems have not been reported to cause a problem.

Relatively little municipal waste water is generated in the Elk Creek subbasin, because of the sparse population. The city of Drain uses land application of treated wastewater. The city stores treated wastewater in a lagoon for summer application. The city of Yoncalla stores treated waste water in a lagoon in order to comply with DEQ discharge limitations. Yoncalla’s wastewater is discharged into Yoncalla Creek.

Water temperatures seasonally exceed the limits tolerable to anadromous fish. Nutrient levels become high during low-flow periods, resulting in algae growth, which in turn reduces dissolved oxygen levels. In combination, conditions reach levels that are critical for aquatic life and the appearance of the streams become aesthetically unpleasant. The most obvious characteristics of the existing water supply is the seasonal high water temperatures and low summer, and excessive turbidity during the fall, winter and spring months.

Table 3-9-1. Mean and Maximum Concentrations of Chemical Constituents and Water Quality Criteria Elk Creek near Elkhead, Oregon (All units in mg/l except as noted).

Parameter	Elk Creek near Elkhead		Drinking Water Standard	Irrigation Criteria
	Mean	Maximum		
Conductivity (um/cm)	12	198	--	<750
pH (standard units)	7.2	7.8	>6.5	4.5-9.5
Calcium	11.6	20.0	--	--
Magnesium	2.93	4.04	--	--
Sodium	7.15	11.6	--	<69
Sodium adsorption ratio (no units)	0.5	0.6	--	<3.0
Chloride	12.9	24.6	<250	<106
Arsenic	<0.01	<0.01	<0.05	0.1
Cadmium	<0.003	0.008	<0.01	<0.01
Chromium	<0.02	<0.02	<0.05	<0.1
Copper	<0.05	<0.1	<5.0	<50
Fluoride	<0.2	0.2	1.4-2.4[1]	<1
Lead	<0.01	0.01	<0.05	<5
Mercury	<0.002	0.002	<0.002	<0.01
Selenium	<0.003	0.004	<0.01	<0.02
Zinc	0.06	0.17	<5.0	<25.0

[1] Fluoride content varies with maximum daily air temperature.

Source: Myers, 1991.

Water quality samples were taken from Elk Creek at Elkton during the months of April through October for 1982, 1983, 1984 and early 1985 (Douglas County, 1989). Sample temperatures consistently exceed 68°F in July and August, and in June, 1982 reached 77°F. Nitrogen levels generally are low, with the maximum nitrate plus nitrite reading at .04 milligrams per liter (mg/l), well below the 0.3 mg/l EPA guideline for aquatic life. In 1982, April and October readings were 0.15 and 0.25 mg/l respectively, which could result from storm run-off. Phosphorous levels also are generally low, compared to the EPA guideline of 0.1 mg/l. Increased values have been noted, such as in late September, 1983 when the phosphorous level was 0.965 mg/l. In April and September of 1982, phosphorous levels also exceeded the guidelines. Dissolved oxygen was above 8 mg/l in all but one sample, which reached 7.9 mg/l in July, 1982 (Myers, 1989).

Table 3-9-2. Waste discharges in Elk Creek subbasin.

LOCATION	RECEIVING STREAM	CATEGORY	WASTE TYPE
Drain Sanitary Treatment Plant	Elk Creek	Minor Domestic	Sanitary Waste
Ranch Motel	Yoncalla Creek	Minor Domestic	Sanitary Waste
Rice Hill West	Yoncalla Creek	Minor Domestic	Sanitary Waste
Yoncalla Sanitary Treatment Plant	Yoncalla Creek	Minor Domestic	Sanitary Waste
Yoncalla Water Treatment Plant	Yoncalla Creek	Minor Industrial	Filter Backwash
Wooley Enterprises	Elk Creek	Minor Industrial	Log Pond Overflow
Wooley Enterprises, Plywood Mill	Pass Creek	Minor Industrial	Log Pond Overflow
Wooley Enterprises, Highway 38	Elk Creek	Minor Industrial	Log Pond Overflow
Wooley Enterprises, Smith River	Pass Creek	Minor Industrial	Log Pond Overflow

Source: Myers, 1991.

Color and turbidity in Elk Creek have the potential to cause some seasonal problems for municipal water use (Table 3-9-3). High color is an aesthetic problem believed to originate from deciduous leaf fall and does not make water unpotable, although filtration is necessary to reduce turbidity to permissible levels. Surface waters in Adams Creek and in Billy Creek have been used for public water supplies in Yoncalla and Drain for a number of years without chemical problems. Excessive turbidity is a seasonal event which occurs during high flows, especially after the first storm in the fall. After the initial storm events, turbidity decreases and then increases as more flood events occur throughout the year.

Table 3-9-3. Summary of color and turbidity data, Elk Creek.

	Color	Turbidity[1]
Elk Creek at bridge near RM 42.2		
Number of Samples	14	16
Mean	51	12
Maximum	175	45
Elk Creek near Drain		
Number of Samples		35
Mean		11
Maximum		50
Elk Creek near Elkton (DEQ)		
Number of Samples	63	35
Mean	24	19
Maximum	100	120
EPA Drinking Water Standard		
Standard	15	1

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[1] Nephelometric turbidity units.

Source: Bureau of Reclamation, 1991

Douglas County has installed and maintains two gages with thermographs in the Elk Creek subbasin. One gage is near Elkhead at river mile 37.5 (since June, 1980). The other gage is near Drain at river mile 26.5, (since October, 1986). Mean monthly temperatures do not exceed 65°F at Elkhead, however maximum mean daily readings have exceeded 65°F during the May through August period. During November through March, temperatures are nearly equal at Elkhead and Drain gages (Figures 3-9-1 through 3-9-4). During March or April through September, the effects of solar heating on diminished flows become evident, and mean monthly temperatures at Drain during June through August are greater than 65°F, and the temperatures at the 2 gages diverge.

Water temperatures were measured during summer 1990 between river mile 0 (mouth) and river mile 42 (Figure 3-9-5). Water temperatures were between about 60 and 65°F for 3 of the 5 sample dates. Water temperatures were notably higher on July 17 and August 14 when air temperatures approached 100 F. Water temperatures were between 60 and 65°F on all dates sampled in the upper Elk Creek, however, water temperature began to significantly diverge among dates below about river mile 35 with greater divergence below river mile 23. This reflects the effect of air temperatures, greater stream exposure to sunlight, and the wider stream below Drain.

The abandoned mercury mine near the east side of the reservoir (See: Section 3.1.4, Mineral and Aggregate Resources) was a low production facility that produced less than 600 flasks. Water samples were collected for tests for several parameters, including

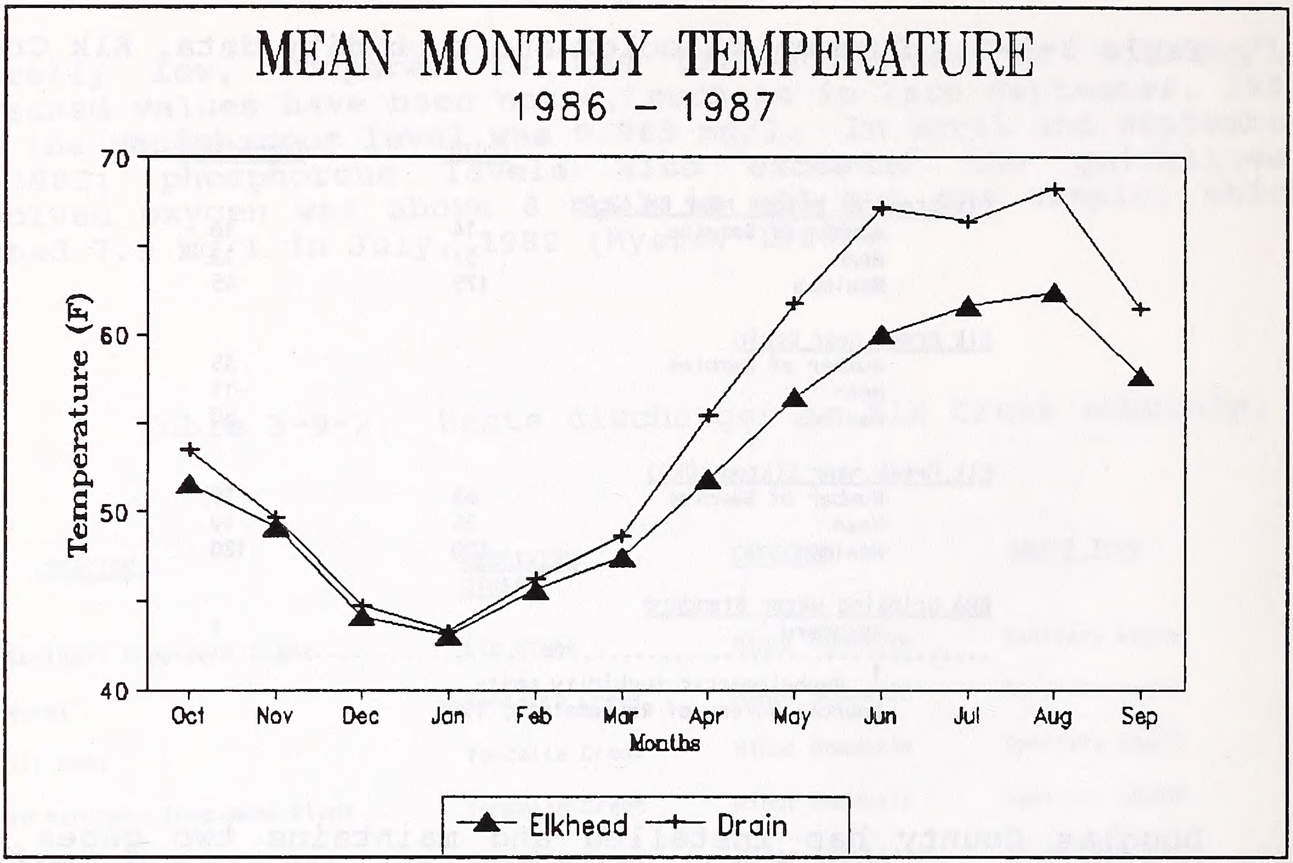


Figure 3-9-1. Mean Monthly Water Temperature, 1986-87.

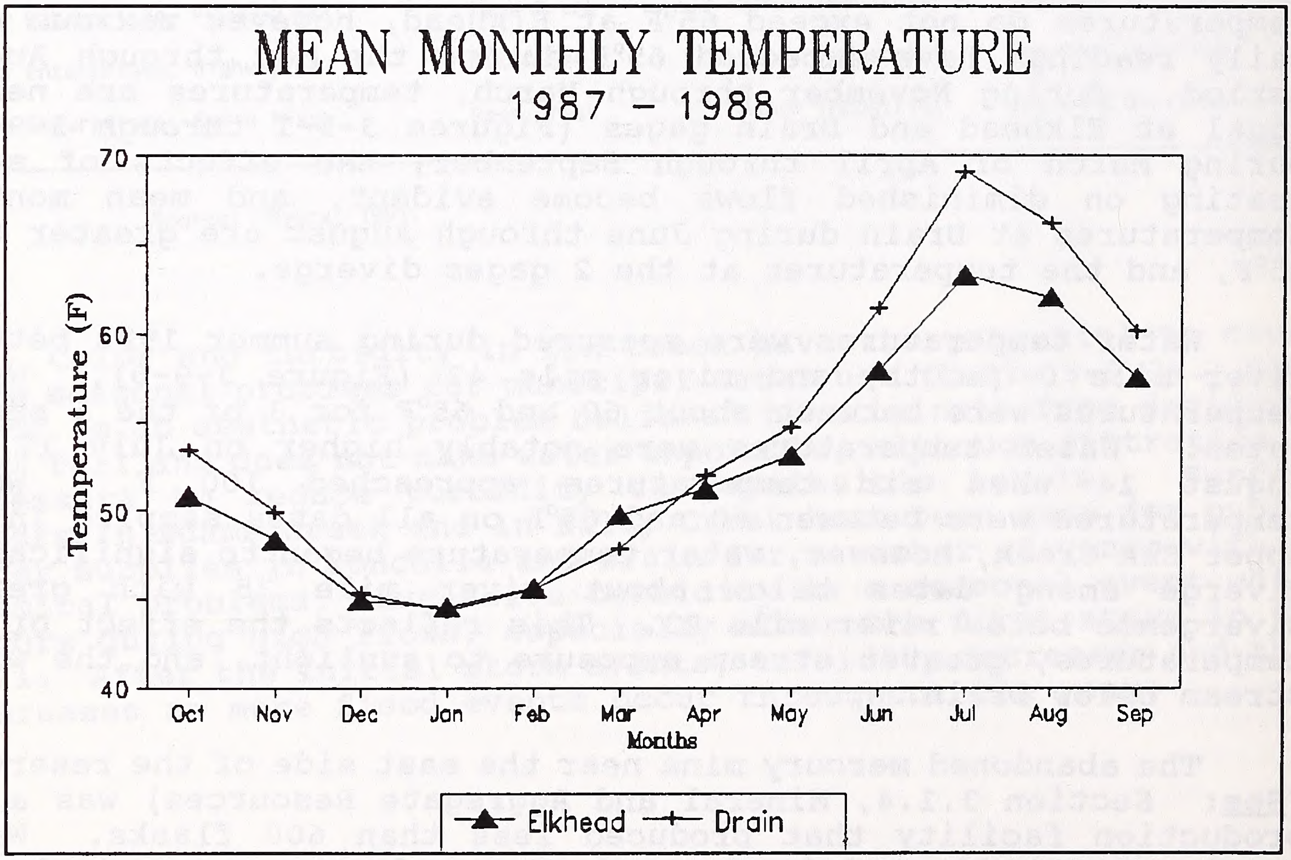


Figure 3-9-2. Mean Monthly Water Temperature, 1987-88.

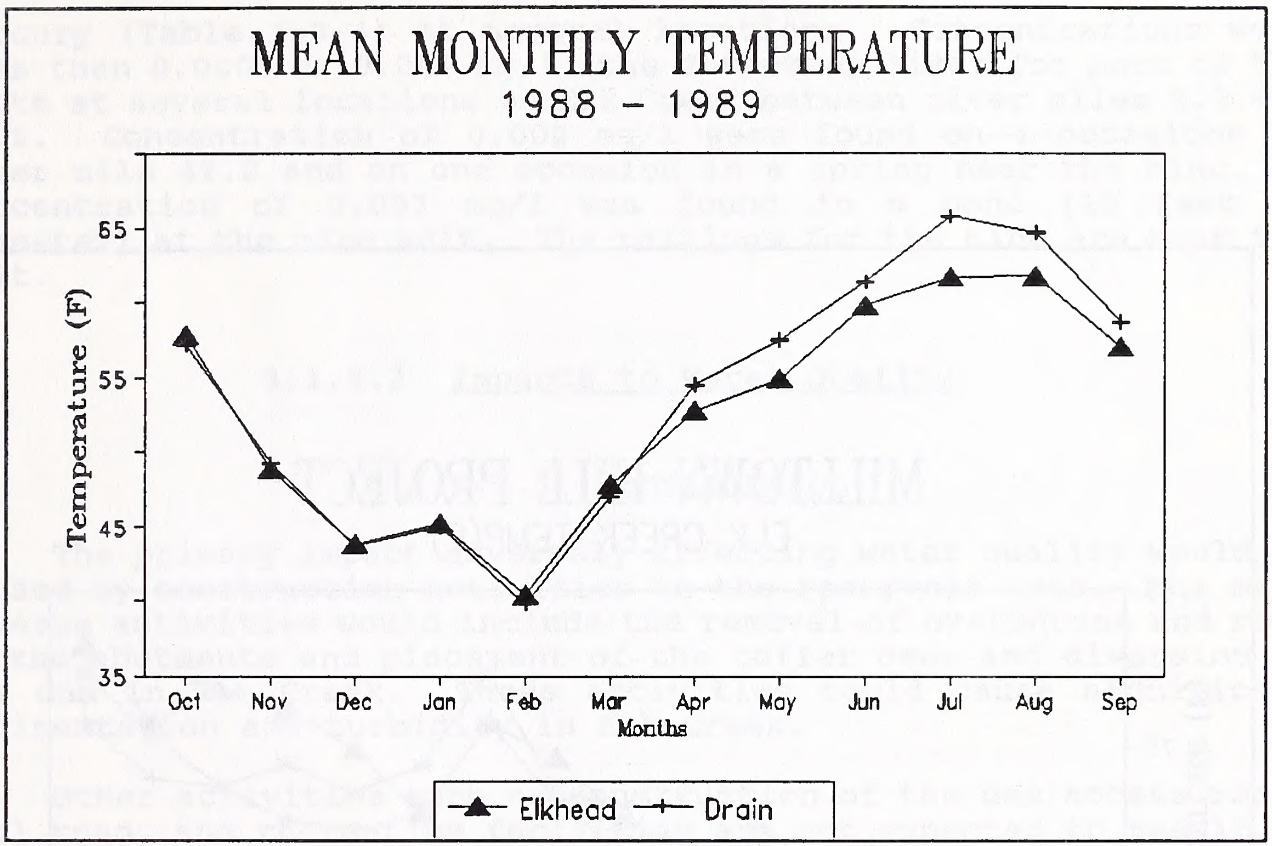


Figure 3-9-3. Mean Monthly Water Temperature, 1988-89.

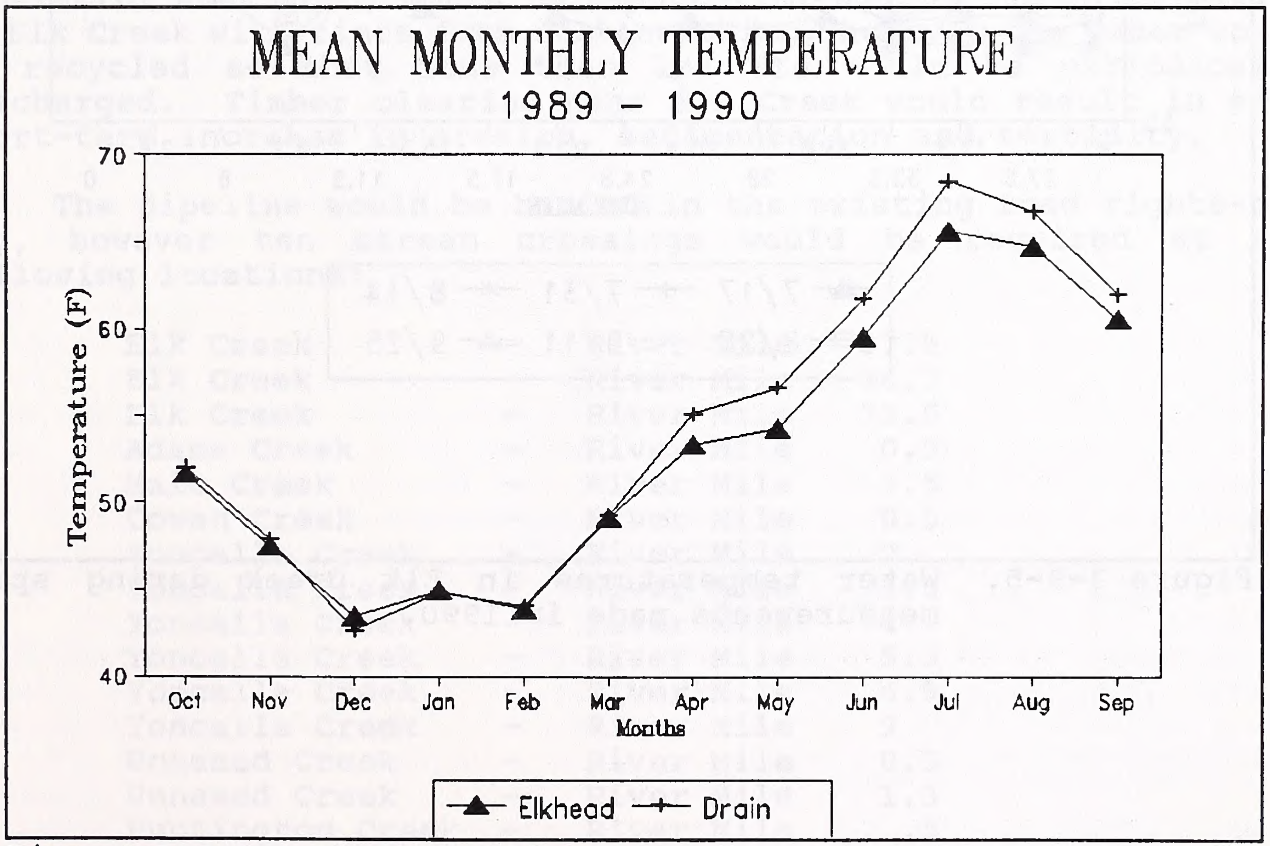


Figure 3-9-4. Mean Monthly Water Temperature, 1989-90.

F:temp88-9

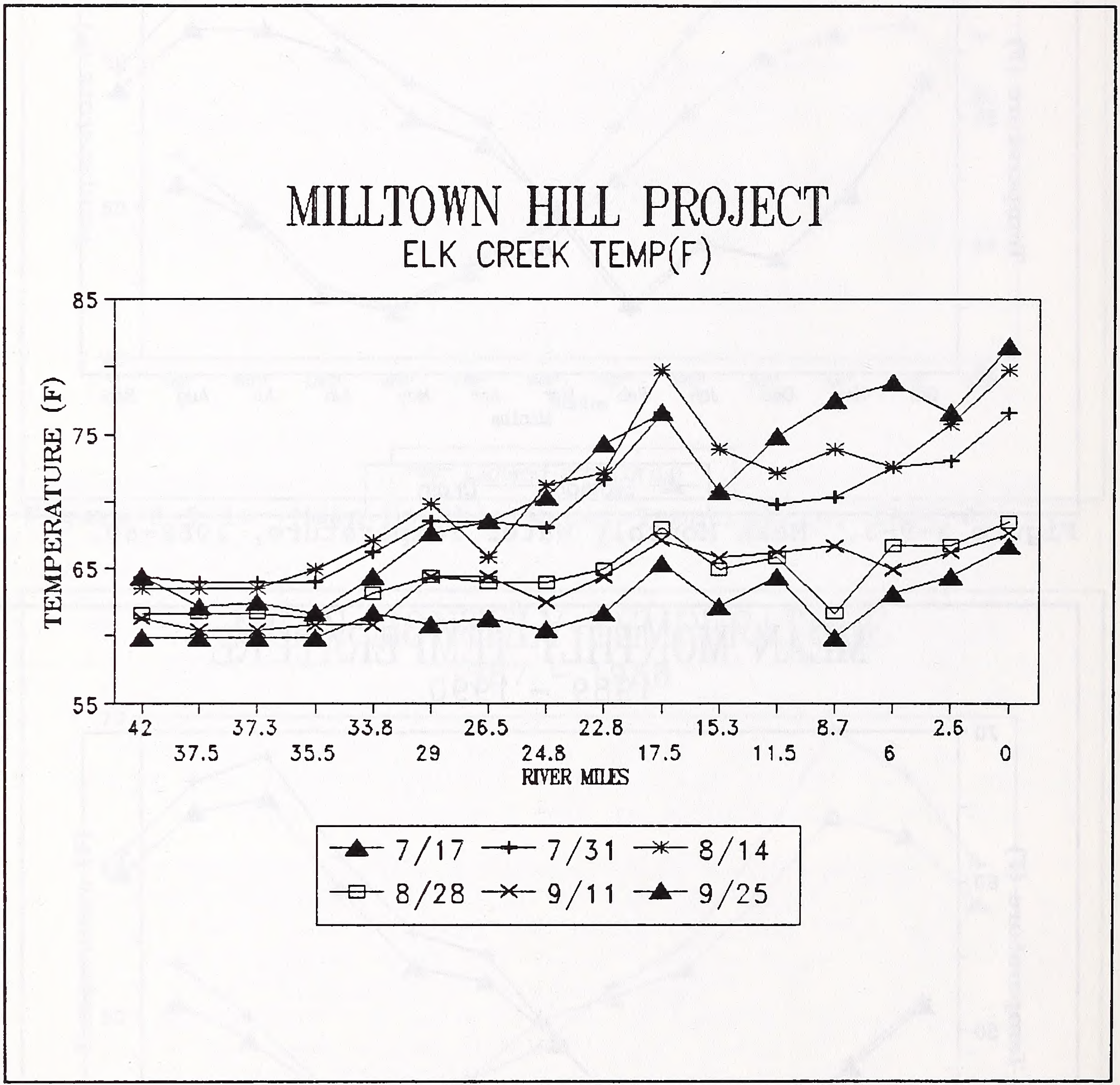


Figure 3-9-5. Water temperatures in Elk Creek during spot measurements made in 1990.

F:Milltemp

mercury (Table 3-9-4) at several locations. Concentrations were less than 0.0005 or 0.001 mg/l, the detection limit for most of the tests at several locations on Elk Creek between river miles 8.2 and 42.2. Concentration of 0.002 mg/l were found on 4 occasions at river mile 42.2 and on one occasion in a spring near the mine. A concentration of 0.003 mg/l was found in a pond (15 feet in diameter) at the mine adit. The tailings for the mine are near the adit.

3.1.9.2 Impacts to Water Quality

3.1.9.2.1 Construction

The primary impact adversely affecting water quality would be caused by construction activities in the reservoir area. The main adverse activities would include the removal of overburden and rock at the abutments and placement of the coffer dams and diversion at the dam in Elk Creek. These activities could cause significant sedimentation and turbidity in Elk Creek.

Other activities such as construction of the dam access road, haul road, and recreation facilities are not expected to result in significant water quality impacts since the activities would be away from Elk Creek. The settling ponds (See: Section 2.2.2.11.2, Contractor Work Area) would be a potential source of contamination of Elk Creek with fines from rock crushing, however the water would be recycled so that less than 1/2 cfs would be periodically discharged. Timber clearing near Elk Creek would result in some short-term increase in erosion, sedimentation and turbidity.

The pipeline would be buried in the existing road rights-of-way, however ten stream crossings would be required at the following locations:

Elk Creek - River Mile 37.5
Elk Creek - River Mile 36.3
Elk Creek - River Mile 35.5
Adams Creek - River Mile 0.5
Halo Creek - River Mile 3.5
Cowan Creek - River Mile 0.5
Yoncalla Creek - River Mile 2
Yoncalla Creek - River Mile 3.3
Yoncalla Creek - River Mile 4
Yoncalla Creek - River Mile 5.3
Yoncalla Creek - River Mile 6.9
Yoncalla Creek - River Mile 9
Unnamed Creek - River Mile 0.5
Unnamed Creek - River Mile 1.3
Huntington Creek - River Mile .5

Table 3-9-4. Results of water, sediment, and fish tissue analyses for mercury from Elk Creek.

SAMPLE DATE	LOCATION	TEST TYPE	MG/L	PPM	PPB	PERFOR BY
05/29/86	BRIDGE CROSSING NEAR RM 42.2	PRIMARY DRINKING	<0.001	-	-	DCWR
11/21/86	BRIDGE CROSSING NEAR RM 42.2	WATER QUALITY	<0.001	-	-	DCWR
02/11/87	BRIDGE CROSSING NEAR RM 42.2	" "	<0.001	-	-	DCWR
05/14/87	BRIDGE CROSSING NEAR RM 42.2	" "	<0.001	-	-	DCWR
08/05/87	BRIDGE CROSSING NEAR RM 42.2	" "	0.002	-	-	DCWR
11/09/87	BRIDGE CROSSING NEAR RM 42.2	" "	0.002	-	-	DCWR
08/23/88	BRIDGE CROSSING NEAR RM 42.2	" "	<0.001	-	-	DCWR
11/14/88	BRIDGE CROSSING NEAR RM 42.2	" "	<0.001	-	-	DCWR
02/27/89	BRIDGE CROSSING NEAR RM 42.2	" "	<0.001	-	-	DCWR
02/18/81	BRIDGE CROSSING NEAR RM 42.2	PRIMARY DRINKING	<0.0005	-	-	DEQ
05/12/81	BRIDGE CROSSING NEAR RM 42.2	WATER QUALITY	<0.0005	-	-	DEQ
12/30/81	BRIDGE CROSSING NEAR RM 42.2	" "	<0.0005	-	-	DEQ
08/18/82	BRIDGE CROSSING NEAR RM 42.2	" "	<0.0005	-	-	DEQ
05/29/86	#1 SPRING @ STORAGE TANK	WATER QUALITY	0.002	-	-	DCWR
05/29/86	#2 POND BELOW MERC MINE	" "	0.003	-	-	DCWR
05/29/86	#3 SEEP BELOW MERC MINE ABOVE #4	" "	0.001	-	-	DCWR
05/29/86	#4 SEEP @ ROADSIDE DITCH AND BELOW #3		<0.001			DCWR
05/29/86	#5 ELK CREEK @ ELKHEAD RD BRIDGE	" "	<0.001	-	-	DCWR
08/89	UNNAMED TRIB NEAR MERC MINE ON RD#8 .25MI FROM RD#7	SEDIMENT ANALYSIS	-	11A	2.3B	DCWR
08/89	UNNAMED TRIB NEAR MERC MINE ON RD#8 .25MI FROM RD#7	SEDIMENT ANALYSIS	-	25A	1.7B	DCWR
08/89	ELK CREEK, RD #7,BR#7,8.45,N.B. 10'D.S.	SEDIMENT ANALYSIS	-	14A	.65B	DCWR
08/89	ELK CREEK, RD #7,BR#7,8.45,N.B. 10'D.S.	SEDIMENT ANALYSIS	-	1.5A	.65B	DCWR
08/89	ELK CREEK DAM FOUNDATION 50'U.S.,AXIS B, LEFT BANK	SEDIMENT ANALYSIS	-	.60A	.65B	DCWR
08/89	ELK CREEK DAM FOUNDATION 50'U.S.,AXIS B, LEFT BANK	SEDIMENT ANALYSIS	-	.26A	.65B	DCWR
10/03/88	RM 17.25	WATER QUALITY	<0.001	-	-	DCWR
10/03/88	RM 17.75	" "	<0.001	-	-	DCWR
10/03/88	RM 32	" "	<0.001	-	-	DCWR
10/03/88	RM 33	" "	<0.001	-	-	DCWR
10/03/88	RM 35.5	" "	<0.001	-	-	DCWR
10/03/88	RM 36	" "	<0.001	-	-	DCWR
09/13/88	ELK CR NEAR DRAIN MP 8.2	" "	ND@0.001	-	-	DCWR
12/27/89	ELK CR /BR STREAM MILE 8.2	" "	0.001	-	-	DCWR
07/02/87	BELOW MERC MINE ABOUT 6 MILES	FISH TISSUE	-	-	16C	DCWR
07/02/87	ABOVE MERC MINE ABOUT 1 MILE	FISH TISSUE	-	-	3C	DCWR
07/02/87	BELOW MERC MINE ABOUT 1 MILE	FISH TISSUE	-	-	ND@1C	DCWR

ND = NONE DETECTED AT LEVEL INDICATED

DCWR = DOUGLAS COUNTY WATER RESOURCES; DEQ = DEPARTMENT OF ENVIRONMENTAL QUALITY

A = VALUES REPRESENT TOTAL MERCURY CONCENTRATIONS OBTAINED FROM 1:5 SOIL EXTRACTS; SOIL EXTRACTS FILTERED THROUGH 0.45 AND 0.10 FILTERS, FILTERED SAMPLES ACIDIFIED AND PRESERVATIVES ADDED.

B = VALUES REPRESENT TOTAL MERCURY CONCENTRATIONS OBTAINED FROM TOTAL DIGESTION OF SOIL SAMPLES.

C = REPORTED AT PPB.

OREGON ADMINISTRATIVE RULES
CHAPTER 340, DIVISION 41 - DEPARTMENT OF ENVIRONMENTAL QUALITY

MERCURY - CONCENTRATION IN MICROGRAMS PER LITER FOR PROTECTION OF AQUATIC LIFE, FRESH ACUTE CRITERIA = 2.4, FRESH CHRONIC = 0.012.

CONCENTRATION IN UNITS PER LITER FOR PROTECTION OF HUMAN HEALTH, WATER AND FISH INGESTION = 144 ng., DRINKING WATER M.C.I. = 0.002 mg.

A typical stream crossing by the pipeline would involve the construction of a trench and the placement of the pipe below the level of the streambed. The trench would then be backfilled with rock to prevent scouring of the trench during high flow periods. Due to the proximity of the trench to the bridge crossing, minimal disturbance of vegetation is anticipated, and significant impact to water quality likely would not occur.

3.1.9.2.2 Operation

When in operation, water quality would improve, primarily due to special dam releases made for fishery purposes and for irrigation along Elk Creek. Return flows would not have harmful effects on the surface water quality because of complete sprinkler irrigation. Up to 85 percent of irrigated lands would be in irrigated pasture, with cattle and sheep production. This would limit the use of harmful pesticides and herbicides on irrigated crop lands.

Surface water supplies are expected to be low in dissolved solids, and would have a very low sodium hazard and very low in boron concentration. In general, surface water supplies are ideal for irrigation.

The same is true for industrial purposes; however, surface water supplies would require treatment before being used for domestic purposes. Treatment would consist of chlorination, and probably turbidity control during periods of extreme runoff into the reservoir.

The operation of the project would result in storage of water that would be released to meet downstream demands including those for fisheries resources. Water quality in the reservoir is expected to be excellent because of the location of the dam in the upper reaches of Elk Creek where basin degradation has been relatively low. The early years of operation of the project would result in minor increased erosional runoff from the areas where construction activities occurred. During winter, storm runoff would increase turbidity and sedimentation in the reservoir, some of which may pass through the reservoir, however, the presence of the "dead pool" (500 acre-feet) in the reservoir is estimated to be sufficient to trap some sediments for 100 years.

The reservoir would have water depths up to about 179 feet at full pool near the dam. Reservoir stratification is expected to result in reduced levels of dissolved oxygen in the lower levels (hypolimnion) which could be released to the stream. However, use of the fixed cone valve should adequately oxygenate reservoir release.

Released material would be used by filter-feeding aquatic invertebrates and their populations would be expected to increase. This would be a beneficial effect since fisheries resources would benefit from an increased food supply as a result of the increases in filter-feeders.

Operation of the dam would result in increased releases of water during summer months. Water temperature modelling of the reservoir releases for several years is shown in Figure 3-9-6. Temperatures of release waters are predicted to be between 40° and 55° F, depending on water year. For 1977, temperature was near 65° F in September due to a low reservoir. Temperatures of release water are up to 20° F lower than natural stream temperatures (Figure 3-9-5).

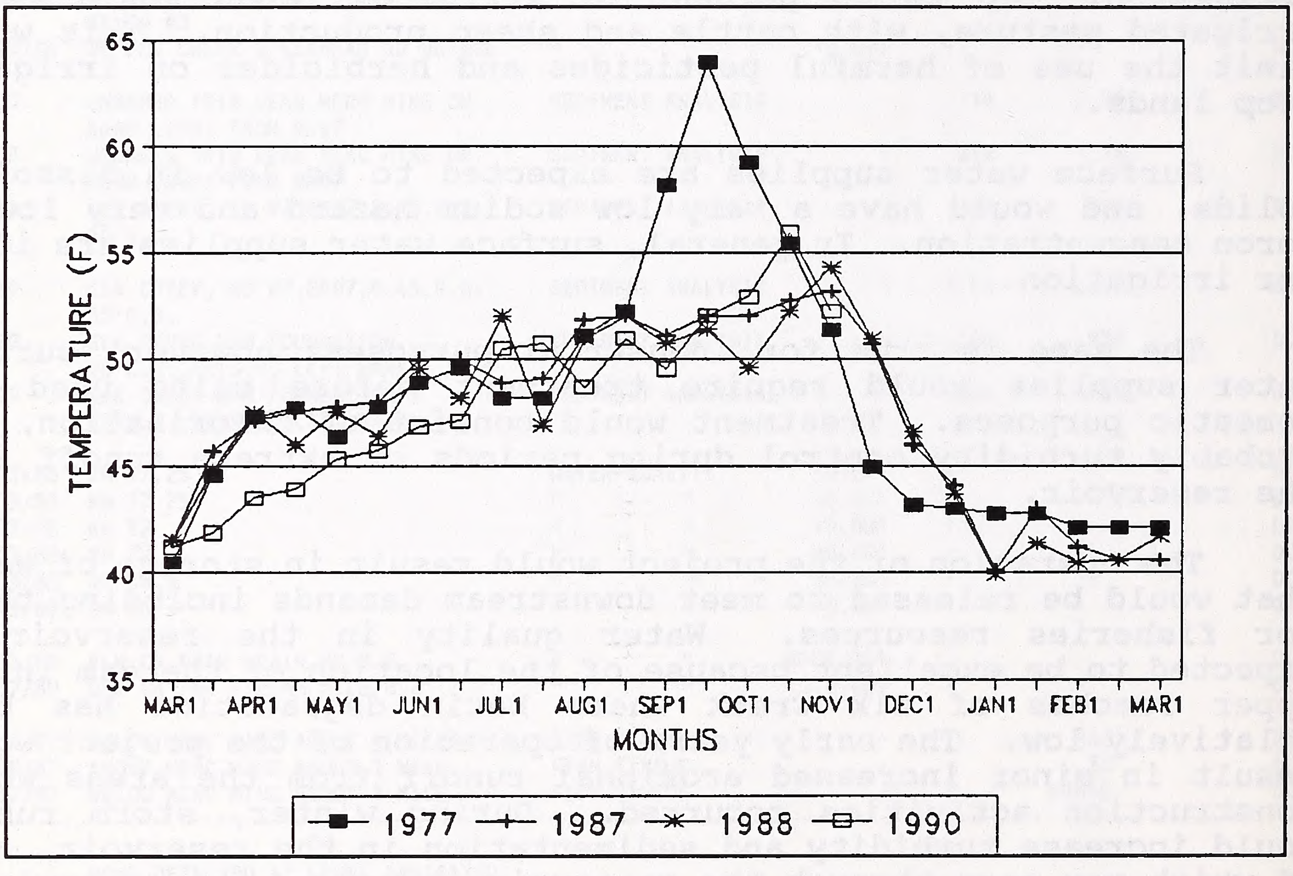


Figure 3-9-6. Average Water Temperatures of Reservoir Release Water (Douglas County Water Resources Survey, 1991).

The effect of the release of cooler water on downstream water temperatures was evaluated by using a stream temperature model (SSTEMP model developed by the USFWS) to predict change in water temperatures between the dam and Elkton. Input parameters, except for flow, characteristic of each month were obtained from Oregon State University, Department of Atmospheric Sciences. The area was divided into 2 segments. Segment 1 was between the dam (RM 39.4) and Drain (RM 26.5) and Segment 2 was between Drain and Elk (RM 0). The differences in the 2 segments were amount of shade and stream width. Model input temperatures at river mile 39.4 (dam) were water temperatures determined with the reservoir model. The output temperature for segment 1 was the input temperature for segment 2. The model was run every 15 days between June 1 and September 15.

The reservoir release temperatures were similar for all years modelled except for the high temperature in September 1977, when temperatures were near 63°F. The average release temperature for the period modelled was used as the input temperature to the stream model except for September. For September, 2 model runs were made with a high temperature of 63°F for 1977 and the average for the other years (52°F).

Flows of 10, 20, 40 and 60 cfs were used in the model to compare the potential impact of flows on water temperature. Total project flows in the range of 30 to 40 cfs would occur during July through September for an average water year, depending on how storage for enhancement would be released. Table 3-8-6 shows an arbitrary release schedule of storage water (fish flow) between July and October for an average water year. The low October flow could be adjusted upward with prior planning, however high flows for temperature control probably would not be necessary during October. Figures 3-9-7 through 3-9-10 illustrate the change in water temperatures for June, July, August, and September. Water temperatures increased from location to location downstream except for September. The decrease in September was due to the high temperature of release water compared to the ambient air temperatures and lower light levels during fall. The impact of flow on temperature is also apparent. The greater the flow, the lower the temperature except for September. The lower temperatures with increased flows reflect reductions in flow travel time as well as reduced solar heating into the water column with larger flows.

Based on these analyses, water temperature would be expected to remain below 65°F between the dam and river mile 10 during summer months when flows are 30 to 40 cfs. The exception, however may be in August when a combination of prolonged hot weather approaching 100°F and low flows would occur. In this situation temperatures above 65 can be expected to occur below river mile 15.

Water quality would be beneficially affected by the release of increased flows of cooler water during summer months. The increased flows would dilute the industrial and domestic wastes while the cooler water would retard the growth of undesirable nuisance algae.

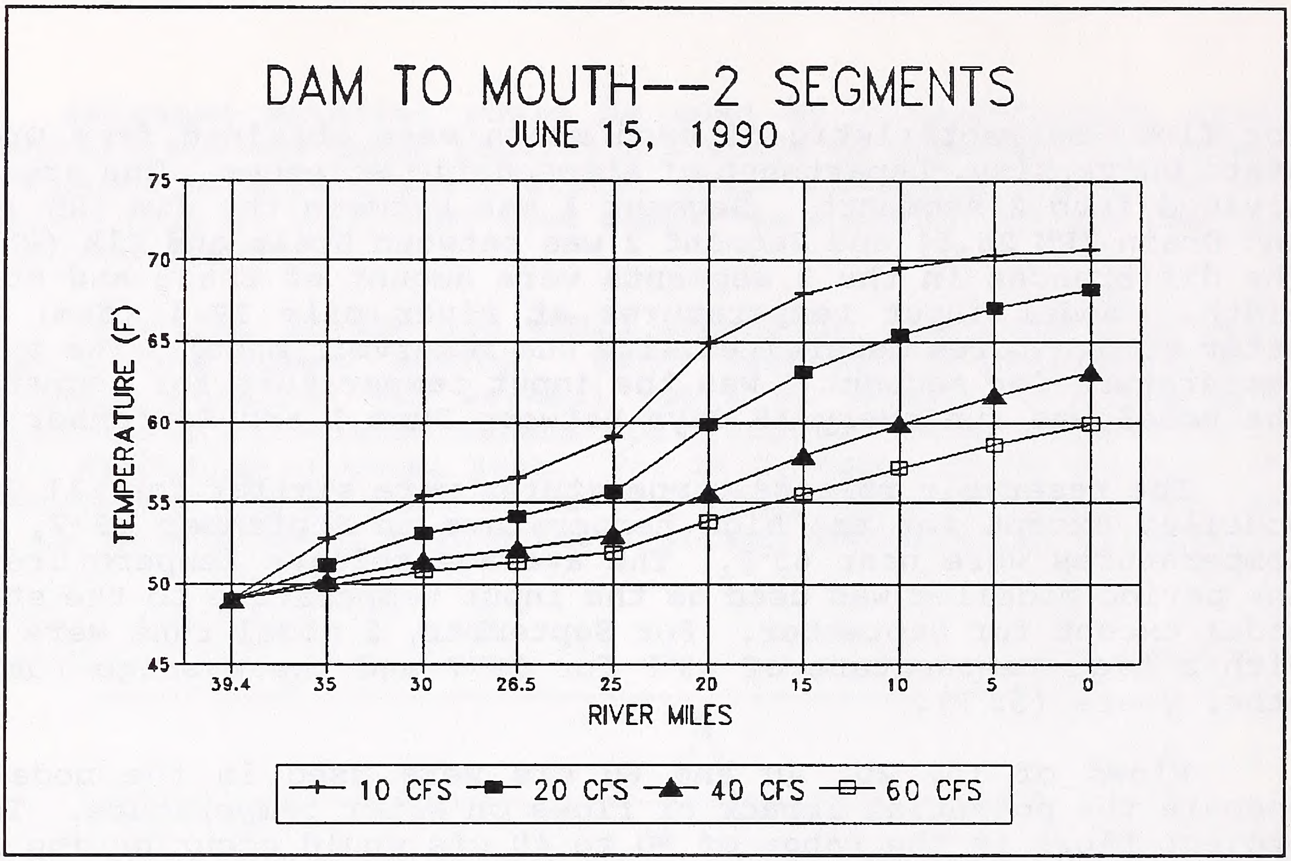


Figure 3-9-7. Predicted Average Stream Water Temperatures for June 15.

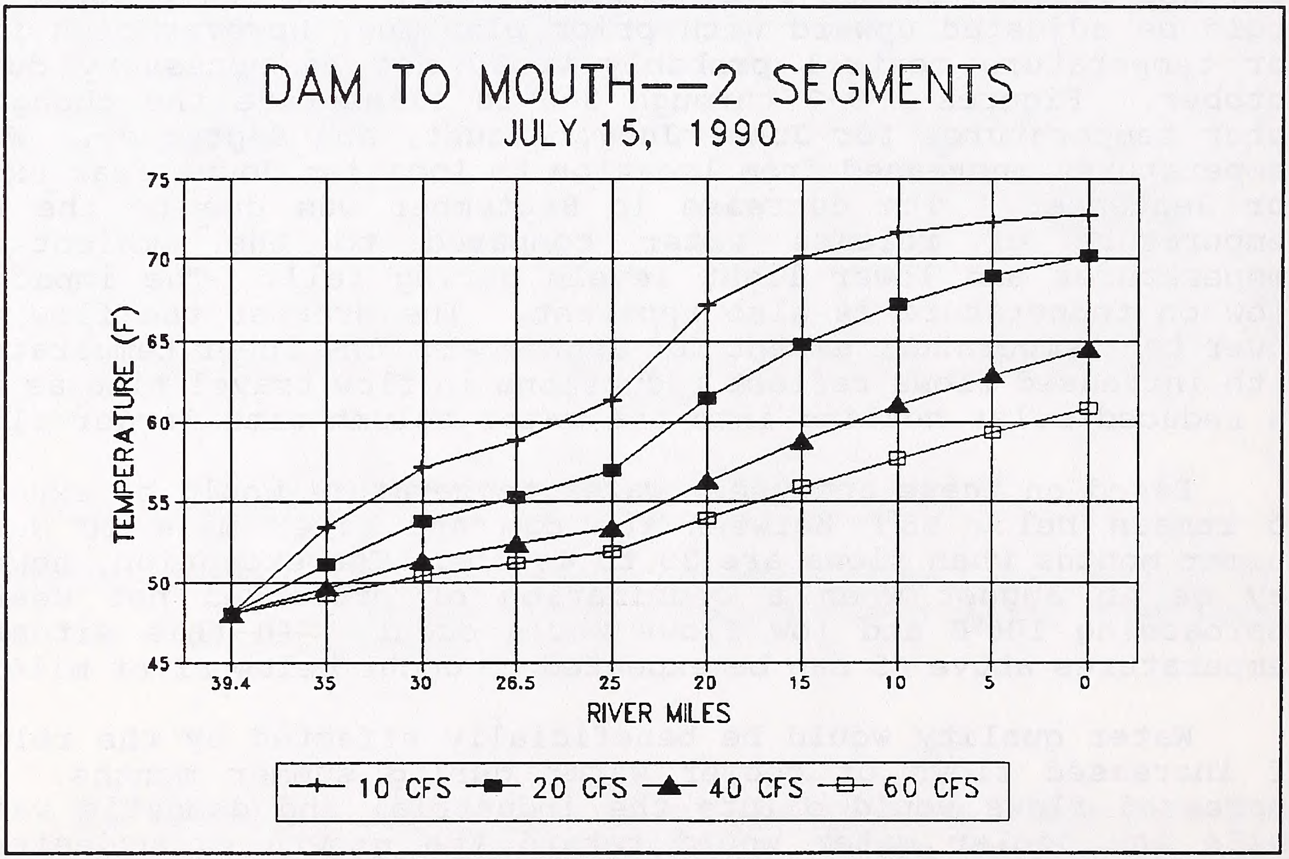


Figure 3-9-8. Predicted Average Stream Water Temperatures for July 15.

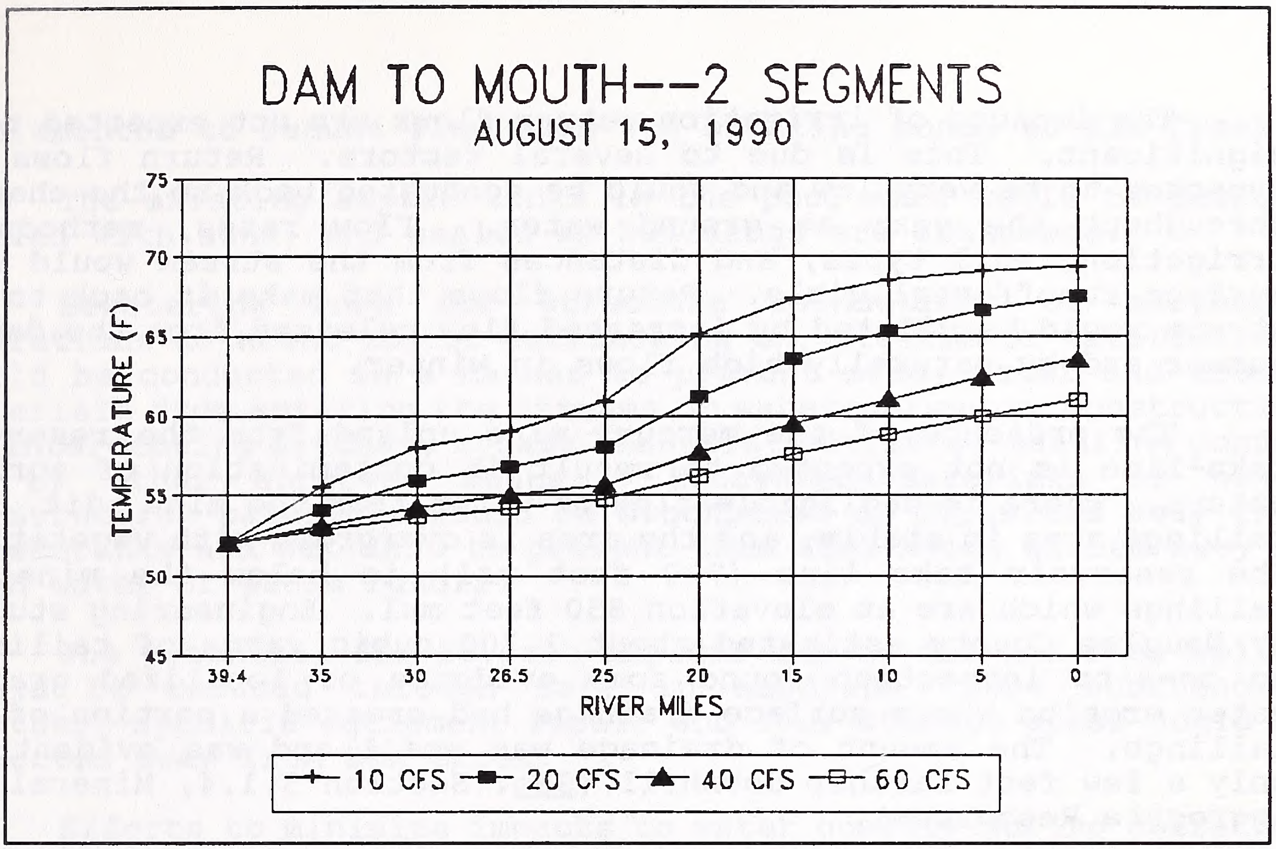


Figure 3-9-9. Predicted Average Stream Water Temperatures for August 15.

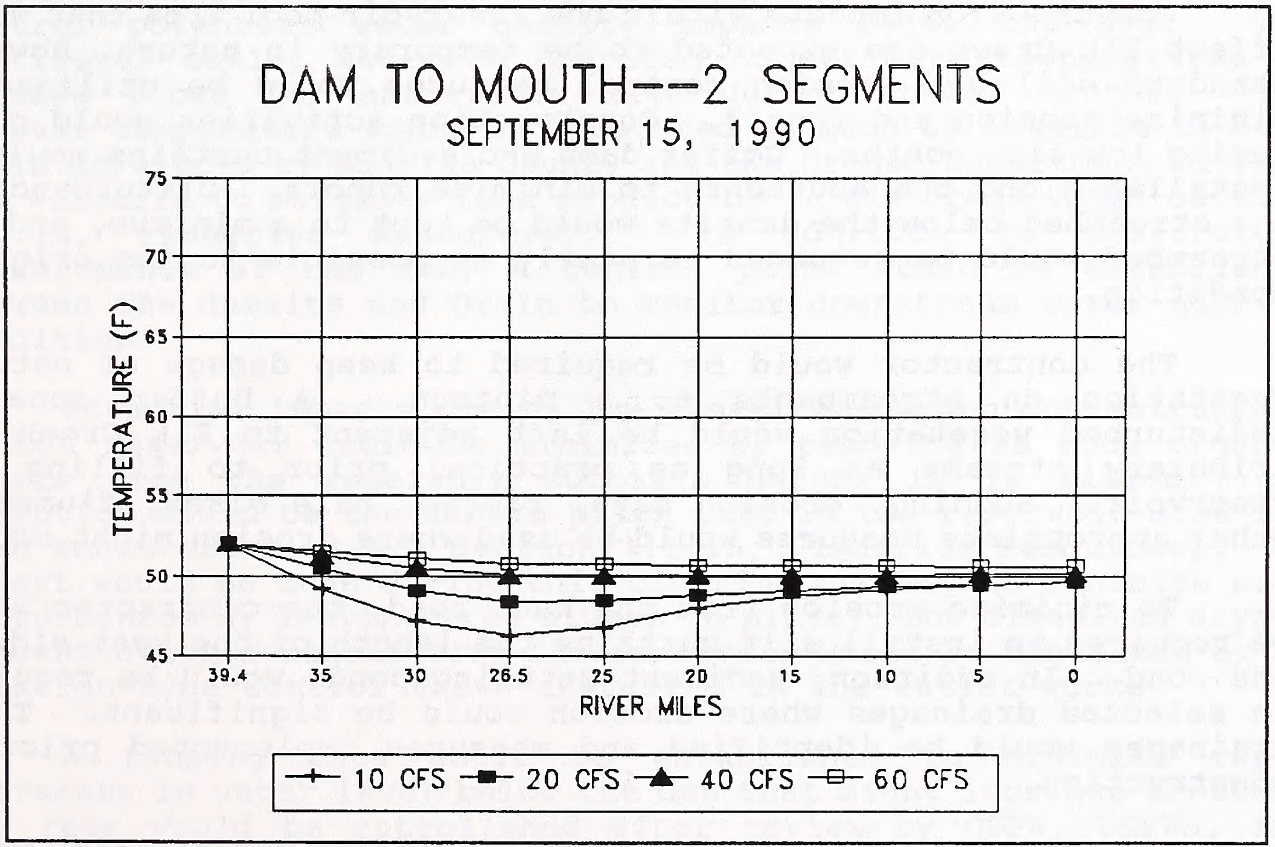


Figure 3-9-10. Predicted Average Stream Water Temperatures for September 15.

The impacts of irrigation return flows are not expected to be significant. This is due to several factors. Return flows are expected to be very low and would be conducted back to the channel throughout the year as ground water. Flow rates, methods of irrigation, soil types, and distances from the stream would make surface runoff negligible. Return flows that make it back to the stream would be diluted by increased flow releases from the dam in summer and by naturally high flows in winter.

The presence of the mercury mine upland from the reservoir take-line is not expected to result in contamination of surface waters. There is negligible flow of water from the mine adit. The tailings area is stable, and the area is overgrown with vegetation. The reservoir take line (780 feet msl) is below the mine and tailings which are at elevation 850 feet msl. Engineering studies by Douglas County estimated about 2,700 cubic yards of tailings. An on-site inspection found some evidence of localized gradual water erosion where surface drainage had crossed a portion of the tailings. The amount of drainage was small and was evident for only a few feet farther downhill (See: Section 3.1.4, Mineral and Aggregate Resources).

3.1.9.3 Mitigation of Water Quality Impacts

Construction impacts within the reservoir pool area that would affect Elk Creek are expected to be temporary in nature, however standard soil and erosion control measures would be utilized to minimize erosion and runoff. Construction activities would occur during low flow months. Coffer dams and sediment curtains would be installed along the abutments to minimize runoff. Disturbance of the streambed below the damsite would be kept to a minimum, and the streambed would be returned as nearly as possible to its original condition.

The contractor would be required to keep damage of natural vegetation on streambanks to a minimum. A buffer zone of undisturbed vegetation would be left adjacent to Elk Creek and tributary streams as long as practical prior to filling the reservoir. Sodding, erosion mats, riprap, bale dikes, flumes or other appropriate measures would be used where erosion might occur.

To minimize erosion from the haul road, the contractor would be required to install silt curtains the length of the west side of the road. In addition, sediment settling ponds would be required in selected drainages where erosion could be significant. These drainages would be identified and measures implemented prior to construction.

The settling ponds for aggregate processing and cleaning would comply with State and Federal water quality standards that define a mixing zone. Recycling of water in these ponds would be implemented to reduce flow from the settling ponds to Elk Creek.

The existing septic tanks in the pool area would be pumped, filled with sand, and sealed as buildings are abandoned.

Dewatering work for structure foundations or earthwork operations adjacent to, or encroaching on, streams or watercourses would be conducted in a manner to prevent muddy water and eroded materials from entering the streams or watercourses by construction of intercepting ditches, bypass channels, barriers, settling ponds, or by other approved means. Excavated materials or other construction materials would be stockpiled or deposited away from streambanks and wetlands to prevent them from being washed away by high water or storm runoff.

The potential for adverse impacts due to oil and fuel spills would be reduced through care in handling these substances. Further, specific equipment repair and fuel storage areas would be selected away from Elk Creek.

Efforts to minimize impacts to water quality during operation of the project include utilization of multilevel outlets, removal of organic debris in the reservoir, minimization of soil disturbance in the reservoir, use of an aeration valve (fixed cone valve). A multilevel outlet system is planned for the reservoir to control potential water quality impacts below the dam. The multilevel outlet would be operated to optimize temperatures of release flows for anadromous fish during summer months. The release temperature would be regulated as much as possible to meet goals developed by Douglas County and the Oregon Department of Fish and Wildlife to maximize fish production in Elk Creek (See: Section 3.1.15, Fisheries Resources). In addition to temperature measurements at the dam, a control point would be established between the damsite and Drain to monitor downstream water quality conditions.

Potential impacts due to low dissolved oxygen concentrations in the reservoir would be minimized by removing as much organic debris from the reservoir subbasin before it is filled. An exception would be the debris piles left in the reservoir area for fish enhancement (See: Section 3.1.15, Fisheries Resources). An effort would be made during this clearing process to minimize soil disturbances by leaving tree stumps in place. Low dissolved oxygen concentration releases from the reservoir would be minimized by an aeration-type control valve installed in the outlet works.

A ramping rate would be established to minimize rapid increases in water level below the dam that might increase erosion. The rate would be established after review by ODFW, USFWS, and NMFS.

Water quality impacts at pipeline stream crossings would be minimized by construction during low (<5cfs) or no flow months. Most of the streams are intermittent during the summer with the exception of Adams Creek and Elk Creek. Flows in these creeks typically decrease to less than 5 cfs during summer months. Streambanks would be restored as nearly as possible to their original condition, seeded with native grasses, and protected from erosion.

All water deliveries for irrigation would be metered. An incremental rate structure would help prevent significant agricultural runoff and the potential for adding agricultural chemicals to the surface water supply. Surface runoff would be negligible during irrigation season and would be diluted by increased stream flows during summer months. Water quality monitoring would be implemented by Douglas County for the reservoir inflows and outflows to establish levels of various nutrients (nitrates and phosphates), mercury, water temperature, pH, and dissolved oxygen.

In the unlikely event that the Elkhead mine is reopened, measures would be required of the mine operator to ensure that contamination of the reservoir does not occur as a result of mine operation. Stringent measures to regulate siting of tailings areas and waste streams would be enforced to comply with applicable local, State and Federal regulations. Erosion of the tailings area runoff would be monitored. If considered necessary, a diversion ditch would be constructed to carry any drainage water away from the tailing area to minimize erosion.

Water quality monitoring required to assure that applicable State and Federal water quality standards are met during construction and operation would be done by the contractor and monitored by Douglas County or its engineer.

3.1.10 Ground Water

3.1.10.1 Existing Ground Water Conditions

Groundwater resources in the Elk Creek subbasin are limited. The majority of the underlying bedrock units consist of Jurassic and Cretaceous age altered sedimentary and volcanic rocks which have low permeability. Water storage in these units is generally in fractures, joints and bedding planes (Bureau of Reclamation, 1991).

The major portion of the rainfall in this subbasin falls on these relatively impermeable bedrock units. Greater than 90 percent of the rainfall is lost in runoff to the seasonal streams with very little recharge to the ground-water system because of the low permeability of the bedrock units (Bureau of Reclamation, 1991). As a result of this, adequate groundwater storage for natural stream regulation does not occur.

In 1977, the U.S. Geological Survey prepared a water resources investigation map for a portion of Douglas County (Robinson and Collins, 1977). The following is taken from this report:

> "Depth to water in wells in the project area ranges from slightly below land surface to as deep as 256 feet. In most places, the depth to water is less than one contour interval of land-surface altitude (80 feet). Thus a map of the altitude of the water table would be a virtual facsimile of the topographic base. Water tends to move in response to differences in water levels, but permeability, and therefore water movement in the reported area is usually greatest parallel to bedding planes in a formation, which are seldom horizontal. Water levels of wells that are unaffected by pumping fluctuate seasonally about 4 to 6 feet, the highest levels occurring during the rainy season, in winter or early spring."
>
> "Alluvium floors the larger valleys, such as those formed by Pass, Yoncalla and Elk Creeks. Alluvium in these creeks are generally thin. In the Drain-Yoncalla area there is little, if any, saturated permeable alluvium at depths greater than 18 feet. The oldest rock exposed in the Drain-Yoncalla area is the Umpqua Formation, which has been subdivided into a lower basalt member and upper sedimentary member consisting of sandstone and siltstone. Wells in the sedimentary rocks yield less than 10 gal/min. Well yields vary widely in the basalt member, the maximum yield reported is 40 gal/min." (Robinson and Collins, 1977).

3.1.10.2 Ground Water Impacts

3.1.10.2.1 Construction

The construction of a reservoir generally alters the groundwater regime in response to changing the local water conditions where the water is impounded. The local water table will usually rise to the elevation of the new water reservoir. Because the permeability of the bedrock units is low, this change may occur over a long period of time. The increase in water levels may affect the stability of the wetted slopes facing the reservoir. The quality and quantity of ground water is not expected to significantly change with the construction of the dam.

3.1.10.2.2 Operation

Areas of slope instability in the reservoir zone could be affected by a rise in ground water. Additional stresses imposed by the rise in water levels could reactivate old landslides.

The effect of increased irrigation on ground water was considered. Sprinkler irrigation methods, properly timed, conserve water and minimize leaching. Consequently, only small amounts of water are expected to reach existing ground water levels through the typically fine- to medium-grained soils. Nutrients, salts, and agricultural chemicals would undoubtedly be carried downward from the surface into the upper soil zone. It is unlikely, however, they would reach the ground water in high concentrations due to physical and chemical filtration processes in the upper soil.

The irrigation return flows to Elk Creek are not considered crucial to maintenance of flows in Elk Creek. The return flows would contribute a small proportion to meeting instream needs for flows, such as for fisheries resources. Also, the relatively small amount of irrigation return flow would not exceed the hydraulic capacity of Elk Creek (See: Section 3.1.8, Water Quantity).

Operation of properly installed subsurface drainage systems during the irrigation season, and during the non-irrigation season should result in improved ground water quality. The systems would provide an improved means of movement of water through the soil, thereby dispersing and equalizing soil nutrients found in the water. Return flows would not have harmful effects on ground water quality or Elk Creek. Project water supplies are expected to be low in dissolved solids, have a very low sodium hazard, and very low boron concentration. In general, project surface water supplies are ideal for irrigation (Hill, 1971).

Impacts during operation would be mitigated by the low amounts of return flow and the releases from the project for instream flows. Return flows would be diluted by at least 5 to 1 when return flows are highest during an average year.

3.1.10.3 Mitigation of Ground Water Impacts

Areas of slope instability in the reservoir area would be identified by additional field work in the design phase. Problem areas identified would be stabilized or protected to prevent mass soil movement into the pool.

Minor adverse impacts to ground water quality during construction of the subsurface drainage system would be lessened by limiting construction activities to the late summer months, when ground water and surface water flows are low.

3.1.11 Vegetation

3.1.11.1 Existing Vegetation

3.1.11.1.1 Uplands

Interior valley vegetation, mixed evergreen forests, and mixed coniferous forests, as defined by Franklin and Dyrness (1973) form the major vegetation zones in the Elk Creek subbasin. Elk Creek supports a relatively narrow zone of riparian vegetation. Extensive human activities (e.g., clearing, logging, grazing, and agriculture) have created a patchwork of altered vegetative types throughout the project area (Fish and Wildlife Service, 1990).

Interior valley vegetation predominates the valley bottoms surrounding lower Elk Creek below Drain. This area is an interspersion of pastures and oak woodlands. The woodlands are composed of Oregon white oak and to a lesser extent black oak, with understory shrubs such as poison oak, scotch broom, elderberry, western hazel, trailing blackberry, and wild rose. Pasturelands are a mixture of introduced and native grasses and annuals. Many pastures have been seeded with species such as rye grass and subclover (Fish and Wildlife Service, 1990).

The mixed-evergreen zone has an overstory of Douglas-fir, western redcedar, and Pacific madrone, with an understory of tanbark oak, Oregon white oak, chinquapin, and various oak species. The shrub layer is often well developed and includes species such as manzanita, Oregon grape, poison oak, and trailing blackberry.

The mixed-conifer zone occurs at the higher elevations and on the wetter, cooler canyon slopes. Overstory trees include Douglas-fir, western redcedar, and grand fir. Bigleaf maple and Pacific madrone occur sporadically throughout this zone. Understory plants include salal, ocean spray, black hawthorn, sword fern, and bracken fern. This zone has undergone extensive logging and is mostly second-growth, with small patches of mature timber remaining on public lands and in the more inaccessible areas of private land. General vegetation types within the project take-line are shown in Figure 3-11-1.

3.1.11.1.2 Riparian and Wetlands

Elk Creek supports a narrow riparian zone on both sides of the stream channel. Dominant species include black cottonwood, red alder, white alder, Oregon ash and various willow species. Understory vegetation varies from dense thickets to openings of low herbaceous species. The riparian habitat within the reservoir pool area and immediately downstream is in fairly good condition.

Further downstream, adjacent to the agricultural area, grazing, homesite development, firewood cutting, and other human disturbances have degraded riparian habitat (Fish and Wildlife Service, 1990).

Most of the agricultural areas have been subjected to some drainage. Grazing or haying activities have altered much of the wetland characteristics. Flat areas in the valley bottoms with saturated hydric soils have some Juncus, Carex, and course grasses tolerant to flooding. The Soil Conservation Service (SCS) has mapped soils in the project area as part of its broader responsibility for identifying agricultural wetlands. Preliminary mapping has tentatively identified about 1,765 acres of hydric soils in the areas proposed for irrigation upstream of Drain, exclusive of the reservoir pool area.

The USFWS National Wetlands Inventory show wetlands areas primarily along riparian corridors of Elk Creek and Yoncalla Creek. The Bureau of Reclamation and FWS identified 225 acres of wetlands in the agricultural service areas where seasonally saturated conditions, hydric soils, and emergent hydrophytic vegetation exist (Bureau of Reclamation, 1991). Further studies by Douglas County in March 1991 identified approximately 203 total acres with wetland hydrology, hydric soils, and emergent aquatic vegetation closely corresponding to the earlier wetland acreage. Of the 203 wetlands acres, 72 are found in Scott's Valley, 102 are in Yoncalla Valley and 28 are in the lower reach of Elk Creek, west of Drain (Figures 3-11-2 and 3-11-3). An additional 31 acres of hydrophytic vegetation and seasonally saturated conditions were identified in the reservoir area. Project wetlands were categorized into "Natural Condition" wetlands and "Manipulated Pasture" wetlands and identified as follows:

> "Natural Condition" wetlands exemplify a classical type of wetlands. Hydrophytic vegetation is highly diverse in size and species type, the water regime is often shallowly ponded; diversity of wildlife species and habitat is apparent. These wetlands are often flood plains found next to streams.
>
> "Manipulated Pasture" wetlands exemplify emergent aquatic vegetation with low diversity, sporadic distribution, less apparent hydrology, and have little or no wildlife species or habitat value. They are located in pasturelands where the ground has often been leveled, having lowered water tables, unable to support a total cover of wetland plant species. Most of the areas identified (60%) are manipulated pasture wetlands.

TOWNSHIP 23 SOUTH, RANGE 4 WEST

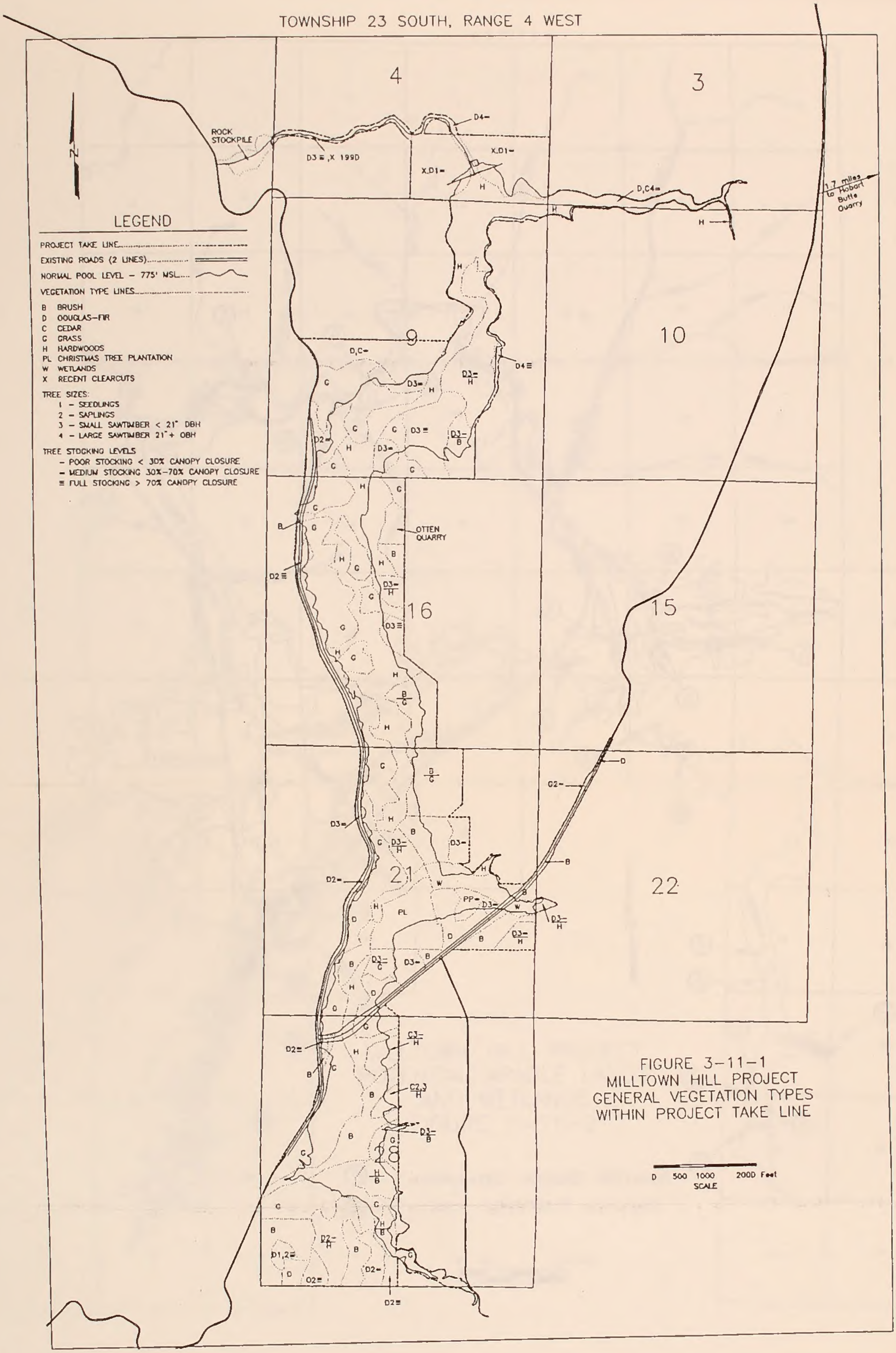
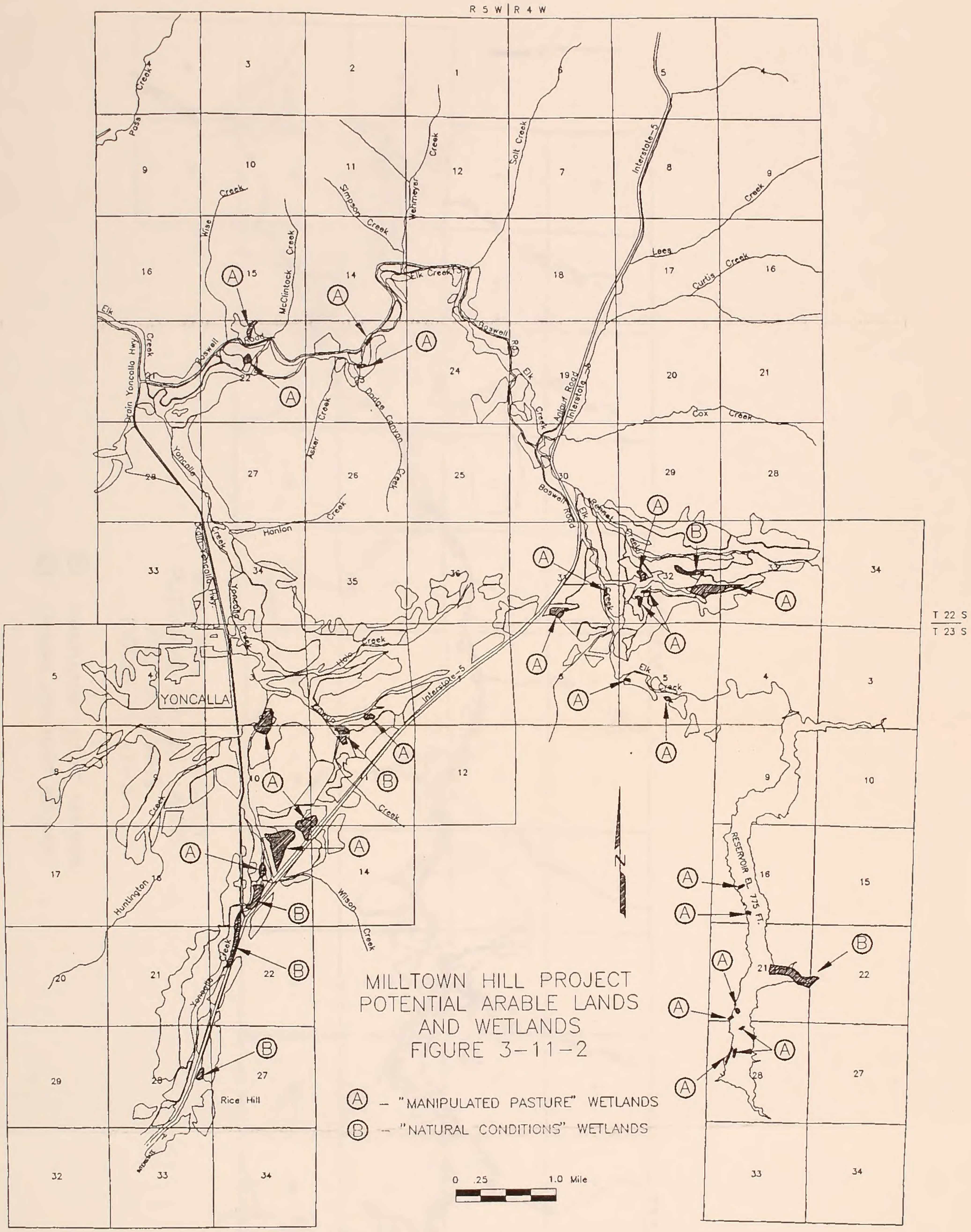


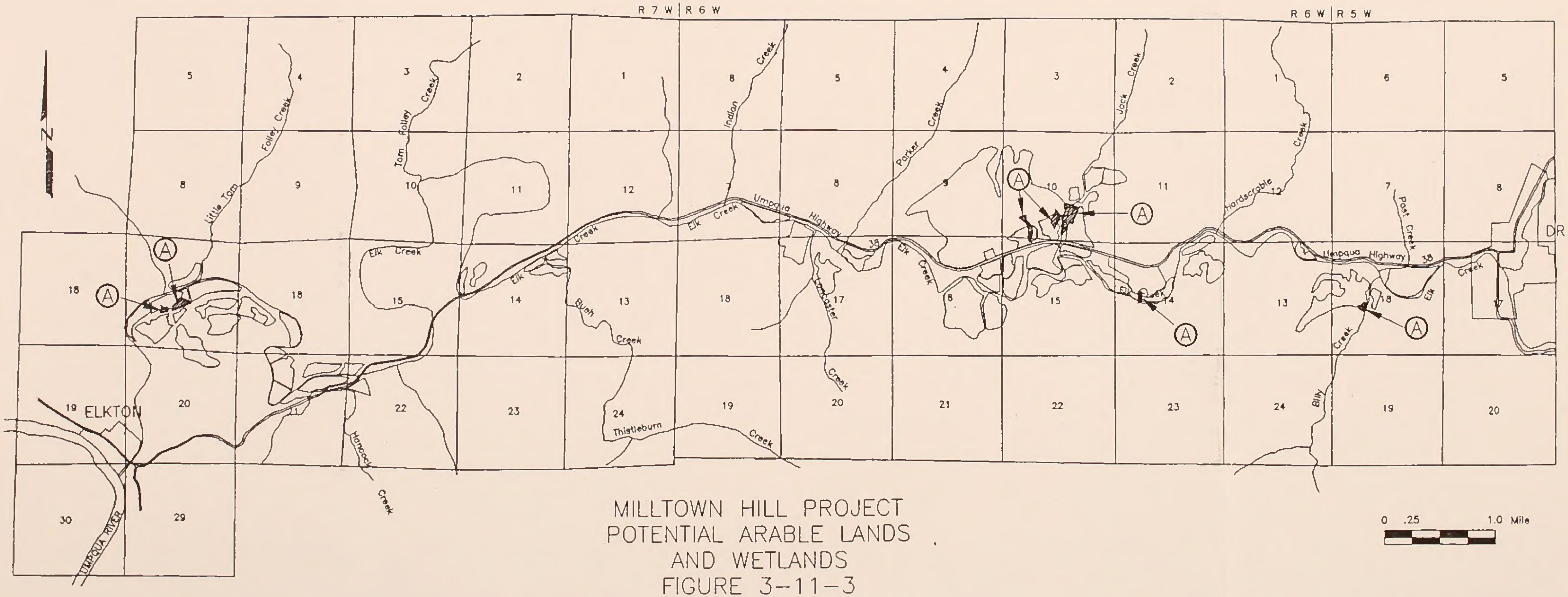
FIGURE 3–11–1
MILLTOWN HILL PROJECT
GENERAL VEGETATION TYPES
WITHIN PROJECT TAKE LINE



MILLTOWN HILL PROJECT
POTENTIAL ARABLE LANDS AND WETLANDS
FIGURE 3-11-2

Ⓐ – "MANIPULATED PASTURE" WETLANDS

Ⓑ – "NATURAL CONDITIONS" WETLANDS



MILLTOWN HILL PROJECT
POTENTIAL ARABLE LANDS
AND WETLANDS
FIGURE 3-11-3

Ⓐ – "MANIPULATED PASTURE" WETLANDS

Ⓑ – "NATURAL CONDITIONS" WETLANDS

3.1.11.2 Impacts to Vegetation

3.1.11.2.1 Construction

The reservoir would inundate 680 acres within the interior valley, mixed-evergreen, and mixed-conifer vegetation zones at a pool elevation of 775 feet msl. The Habitat Evaluation Procedure (HEP) determined the wildlife cover types that would be lost are about 173 acres of riparian, 260 acres grass/pasture, 238 acres of shrub/timber, and 9 acres of stream/open water. About 680 acres of aquatic habitat would be created in the reservoir. On the remaining 100 acres in the takeline area, an additional 50 acres would be lost or disturbed by development of the Otten Quarry, construction of recreation areas, and road relocations. This includes about 15 acres of grass/pasture, 30 acres of shrub/timber, and 5 acres of riparian.

Field investigations estimated that out of a total 203 acres of wetlands, about 28 acres of wetlands are located in the agricultural areas that could be served with project water. Approximately 31 acres of wetlands vegetation would be lost due to reservoir inundation. About 60% of the wetlands are manipulated pasture wetlands.

The installation of the pipeline system would require excavation in existing road rights-of-way. Loss of vegetation would be minimal because these areas are either cleaned or sprayed periodically to maintain water drainage. Pipeline stream crossings (See: Section 3.1.9, Water Quality) would be trenched near the bridge crossings. Minimal disturbance of vegetation is anticipated.

The placement of subsurface drainage pipe would disrupt the vegative cover on up to 15.6 acres of existing pasture land. The trench would be filled and then seeded with suitable grass species.

3.1.11.2.2 Operation

Project operation generally would not affect vegetation in the reservoir pool. The annual drawdown could cause a dewatering of small slough areas along the margins of the reservoir which could cause a loss of a small amount of riparian vegetation seasonally and a drying-up of wetland areas. Operation of the improved irrigation systems, with new subsurface drainage systems would produce increased crop vigor and yield, and also allow crop diversification.

3.1.11.3 Mitigation of Impacts to Vegetation

Those areas temporarily disturbed by construction activities would be recontoured and revegetated after construction to hasten rehabilitation. Native vegetation would be used to the extent possible. The loss of 173 acres of riparian vegetation by reservoir inundation would be mitigated by habitat enhancement on portions of Elk Creek downstream of the dam site. Enhancement would include plantings and/or fencing in areas where vegetation has been affected by grazing, brush clearing, and other human activities. The loss of wetlands in the reservoir area (approximately 31 acres), would be mitigated by development of wetlands in the upper end of the reservoir. This would be done by planting shallow marsh plants such as horsetails, cottails, spikerush, bur-reed, skunk cabbage, toad rush, tufted hair grass, and manna grass. There would be no significant loss of wetland values in the project area. The values of created wetlands at the upper end of the reservoir would be higher than the existing values of "manipulated pasture" wetlands that occur in the reservoir site. (*See*: Section 3.1.14, Wildlife Resources).

Wetlands would not be lost in the service area. The wetlands that have been identified would be protected from farming operations by the County. This would be enforced by informing the land-owners of the areas to be protected as the water is subscribed. No project drainage or change in agricultural practices would occur to negatively affect jurisdictional wetlands at the time the water service contract is negotiated. This would be enforced by County with a wetland protective clause in the water service contract between the County and individual water user.

Impacts that result from pipeline stream crossings would be mitigated by construction during low or no flow months. Bank material would be removed and replaced, the area re-seeded, and erosion protection applied.

Douglas County would purchase an abandoned 3 acre log storage pond in cooperation with the Oregon Department of Transportation (ODOT). The log pond is located on private land north of Yoncalla in section 28, Township 22 South, Range 5 West. ODOT would use a portion of the land for a maintenance shop. The County would administer the remainder of the grounds and the pond. The County would maintain the pond, the surrounding area, and riparian areas along Yoncalla Creek. Management would involve enhancing the wetland area for wildlife and developing recreation facilities compatible with that use. Parking spaces, a rest area, and trails would be included. The County plans to negotiate management of the wetland area with the Yoncalla Recreation District. If the Recreation District would not want to administer the area, then Douglas County Parks Department would assume management responsibilities.

3.1.12 Agriculture

3.1.12.1 Existing Agricultural Conditions

Douglas County farms can be characterized as livestock farms and ranches, with a few general crop, orchard, and vegetable farms. A fulltime farm unit generally includes some non-irrigated pasture as well as irrigated pasture and hay to support a livestock operation. This is reflected in the fact that about 80 percent of total sales of agricultural products in Douglas County in 1987 was from livestock sales. Although some small grains are grown, they are generally a minor enterprise on farms in the subbasin (Myers, 1991).

The agricultural lands in the reservoir pool area and downstream of the dam are pasture areas for sheep and other livestock or hay crops that are typically located in the bottoms along the stream course. Land within the project that is suitable for irrigation is used almost exclusively as grass pasture, hay, or combination pasture-hay. A very minor acreage is in wine vineyards, orchards or Christmas tree farms. A significant acreage of the alluvial lands have been improved by clearing of timber and underbrush with subsequent seeding to grass. Outlying slopes are generally unimproved or native range with scattered brush and timber. There are about 115 acres of prime farmlands in the reservoir area (See: Section 3.1.3, Soil and Land Classification). The composition of land use in the Elk Creek subbasin is very similar to that in the remainder of the County. Table 3-12-1 presents the land use summary for the Elk Creek subbasin.

Table 3-12-1. Summary of Land Use in Elk Creek Subbasin.

Land Use	Acres	Percent
Forest land	106,400	62
Farm/forest	38,720	22
Agriculture	24,640	14
All others (urban, etc.)	3,840	2
Total	173,600	100

Lands in the Farm/forest classification have some of the characteristics of both agricultural and forest lands.

Source: Myers, 1991.

There are about 7,377 acres of arable lands in the project service area based on criteria developed by the Bureau of Reclamation (Myers, 1991). Presently, about 1,533 acres are irrigated, but irrigation flows are frequently curtailed during summer months due to lack of water. About 897 acres of the 1,533 acres require supplemental supplies (Myers, 1991).

3.1.12.2 Impacts to Agriculture

3.1.12.2.1 Construction

Approximately 251 acres of existing farmland would be inundated by the reservoir. Another 100 acres would be needed for the take-line area above the reservoir 775 foot line to provide for flood levels at the 780 elevation, to construct new roads and to provide for recreation facilities. About, 115 acres of prime farmlands would be lost in the reservoir pool area (Figure 3-3-4). The pipeline would be constructed in new and existing road rights-of-way. The pipeline to water users would be both buried and movable surface pipe.

3.1.12.2.2 Operation

The project would allow a full irrigation supply for 2,601 acres by the pipeline distribution system and 1,163 acres by pumping directly from lower Elk Creek. In addition, those lands not now receiving sufficient water (approximately 897 acres) would receive a supplemental supply (Myers, 1991). This would result in a total service to 4,661 acres (Douglas County Water Resources Survey, 1990).

The operation of the project would enhance production to 4,661 acres of arable land in the service area between river mile 39.4 and river mile 0 at Elkton.

Irrigation in the service area would provide a change from present dry pasture, hay production to irrigated clover and alfalfa production. This would allow for substantial increase in livestock carrying capacity, resulting in increased farm income. Irrigation could also permit the production of row crops and specialty crops, such as sugar beets, corn, strawberries, raspberries, blackberries, boysenberries, and wine grapes.

3.1.12.3 Mitigation of Impacts to Agriculture

The loss of 260 acres of agricultural lands by reservoir inundation and the construction of project facilities would more than be offset by providing increased irrigation water to 4,661 acres of agricultural lands in the service areas.

3.1.13 Timber Resources

3.1.13.1 Existing Timber Resources

There are approximately 364 acres of commercial forest land within the 1,192-acre project take line. The ownership is as follows:

Private	140 acres
County	134 acres
BLM	90 acres
Total	364 acres

Size class distribution of timber within the project take-line is shown below:

Seedlings	30 acres
Saplings	90 acres
Sawtimber	244 acres
Total	364 acres

Estimated volume of timber on the 244 acres of sawtimber is 4.5 million board feet. The estimated 1991 stumpage value is $1,080,000.

3.1.13.2 Impacts to Timber Resources

3.1.13.2.1 Construction

Approximately 160 acres of commercial forest lands would be inundated by the reservoir. An additional 20 acres would be cut to provide for a new access road to the base of the dam and relocation of County Roads #7 and #8. Not all the timber within the reservoir would be cut and removed. Approximately 90 acres of timber near the dam and in Walker Creek arm would be left standing, to provide cover for fish and nesting places for waterfowl, eagles, and osprey. An additional 60 acres in the south end of the reservoir and in the wildlife area south of the reservoir would be preserved to provide habitat for wildlife. Construction of the project would result in an estimated timber revenue loss of $2,620,800 (1991 dollars) over an 80-year rotation period.

3.1.13.2.2 Operation

There would not be an additional loss of timber because of project operation. Operation of the reservoir, with recreational developments, may affect BLM's timber harvesting policy on its lands adjacent to and in view from the reservoir. Timber harvesting may be restricted or curtailed on these lands.

3.1.13.3 Mitigation of Impacts to Timber Resources

The loss of 364 acres of commercial forest land would not be mitigated.

3.1.14 Wildlife Resources

3.1.14.1 Existing Wildlife Conditions

The subbasin between Elkton and the proposed reservoir supports vertebrate animal species typical of lower elevations of the biogeographical regions in western Oregon. The natural habitat has been greatly altered by land use practices. Specialized habitats such as old growth and mature forests, snags, open water wetlands, and undistributed riparian areas are uncommon or absent. However many wildlife species are associated with the interspersion of several plant communities and the associated edge effect, a high degree of foliage height diversity, and the riparian community which transects the area (Fish and Wildlife Service, 1990).

Big game species that frequent the subbasin include black-tailed deer, Roosevelt elk, mountain lion, and black bear. Of these, black-tailed deer are the most widespread and numerous. Since this area is usually below the snow-line, the area supports year-long populations averaging about 30 deer per square mile. The riparian zone is especially important habitat for black-tail deer. Other species of big game use the project area infrequently because of the extent of human habitation in the area (Fish and Wildlife Service, 1990).

Upland game species include ring-necked pheasant, valley quail, mountain quail, blue grouse, ruffed grouse, mourning dove, band-tailed pigeon, western gray squirrel, and brush rabbit. Wild turkeys have been introduced throughout the area by Oregon Department of Fish and Wildlife. The population has been steadily increasing (Fish and Wildlife Service, 1990).

Nesting waterfowl numbers are low because of the lack of open water and permanent wetland areas with suitable habitat. A few pairs of mallards, wood ducks, and teal species are probably associated with Elk Creek in the proposed reservoir pool area.

Mallards, wood ducks and Canada geese nest at farm ponds or log ponds scattered throughout the agricultural areas proposed for irrigation. A variety of waterfowl and shorebirds use the agricultural wetlands for feeding and resting during migration and for a wintering ground, especially if major storms move birds inland. In addition to the above species, teal, pintail, gadwall, coot, widgeon, mergansers, grebes, goldeneye, and scaup would also use the open water and wetland habitats. Wading and shorebirds would include great blue heron, killdeer, sandpipers, snipe, bittern, and rails (Fish and Wildlife Service, 1990).

Furbearers include beaver, skunk, otter, mink, muskrat, raccoon, coyote, and gray and red fox. The subbasin supports a variety of nongame wildlife such as numerous small mammals, raptors, passerine birds, reptiles, and amphibians. The Oregon Department of Fish and Wildlife has an active Nongame Wildlife Program that involves population and habitat inventory and analysis and public environmental education. Species of high interest to the Nongame Wildlife Program that occur in the project area include the osprey, bald eagle, and western pond turtle (Fish and Wildlife Service, 1990).

A limited amount of hunting of black-tailed deer, waterfowl, and upland game occurs throughout the subbasin. The opportunity is limited because of the private lands and residences where hunting is restricted or inconsistent with existing land use. It is estimated that about 100 hunter days occur annually (Fish and Wildlife Service, 1990).

The Fish and Wildlife Service's Habitat Evaluation Procedure (HEP) was used to assess the value of wildlife habitat in the project area (FWS 1990). Because of the lack of controversial issues and no extremely sensitive wildlife resources, a modified HEP process was used. The HEP analysis defines existing conditions and anticipated future without project conditions, expressed in habitat units, for evaluation species specifically chosen for the area. Habitat units are derived from acres of usable cover types and the quality of the habitat as expressed by a habitat suitability index (HSI). A similar analysis is then applied to the anticipated conditions at selected years (target years) during the development and operation of a proposed project. The difference between the two analyses, as expressed in average annual habitat units (AAHU), defines the impacts of the project. Finally, an additional analysis is completed to determine the amount of mitigation that would compensate or offset the impacts over the life of the project.

Seven evaluation species were selected for the HEP study (Table 3-14-1). These evaluation species represent a mix of economically important, public interest, or ecologically important species and represent four cover types associated with the project area. The species were chosen to represent both the existing conditions, the proposed project conditions, and the future without the project ecological conditions. Hence, wildlife species are included that would be associated with the proposed reservoir.

The HSI reflects the quality of an evaluation species' habitat. An HSI of 0.0 indicates no habitat value and an HSI of 1.0 indicates ideal habitat value. As summarized in Table 3-14-2, the HEP study concluded that HSI values for the evaluation species in the existing environment ranged from 0.36 for downy woodpecker to 0.87 for western pond turtle.

Table 3-14-1. Species and Cover Type Association and Acreages for Baseline HEP Conditions, Milltown Hill Reservoir.

Species	Riparian	Grass/ pasture	Shrub/ timber	Stream/ reservoir	Total acreage
Downy woodpecker	188		782		970
Western meadowlark		407			407
Yellow warbler	188				188
Wild turkey	188	407	782		1,377
Black-tailed deer	188	407	782		1,377
Osprey				0	0
Western pond turtle				9	9

Source: Fish and Wildlife Service, 1990.

Table 3-14-2 includes the AAHU for the HEP study evaluation species for baseline conditions within the project area. The AAHU's reflect both the quality and quantity of available habitat. The black-tailed deer, which uses all cover types, also had a relatively high HSI value and accounts for the most AAHU's. On the other hand, the western pond turtle, which also had a high HSI value, had the lowest AAHU's due to a small amount of habitat under present conditions. AAHU's for the other species showed the same relationship between habitat quality and quantity (Fish and Wildlife Service, 1990).

Table 3-14-2. Acres of available habitat, baseline conditions (HSI's and habitat units (HU's) and AAHU's[1]).

Evaluation species	Acres of habitat	HSI	HU's	AAHU's
Downy woodpecker	970	0.36	349	349
Western meadowlark	407	0.62	252	252
Yellow warbler	188	0.58	109	109
Wild turkey	1,377	0.48	661	589
Black-tailed deer	1,377	0.80	1,102	1,005
Osprey	0	0.47	0	0
Western pond turtle	9	0.87	8	8

---

[1] AAHU's represent the average annual habitat units over the life of the project (100 years). Where changes in future without the project conditions occur, the AAHU's are different from the HU's.

Source: Fish and Wildlife Service, 1990.

3.1.14.2 Impacts to Wildlife Habitat

3.1.14.2.1 Construction

The reservoir would inundate 680 acres at normal full pool. The HEP analysis determined the wildlife cover types that would be lost are about 173 acres of riparian, 260 acres grass/pasture, 238 acres of shrub/timber, and 9 acres of stream/open water. About 680 acres of aquatic habitat would be created in the reservoir. On the remaining 706 acres in the take-line, an additional 50 acres would be lost or disturbed by development of the quarry, recreation areas, and road relocation. This includes about 15 acres of grass/pasture, 30 acres of shrub/timber, and 5 acres of riparian. The pipeline would be buried in existing road rights-of-way and minimal habitat would be affected.

Field investigations by Bureau of Reclamation, the USFWS, and County estimated that out of a total of 225 acres of wetlands, about 28 acres were in areas where conversion to agricultural fields could occur due to close proximity within the potentially arable land base. This action would not be permitted by the County. Another 31 acres of wetlands in the reservoir pool area would be inundated.

3.1.14.2.2 Operation

Project operation would have the most pronounced and immediate effects on small animals, such as burrowing rodents, reptiles, and amphibians with limited territories. Individuals of those species would be killed by reservoir inundation. Wide ranging species, such as predators and big game species, would lose a portion of their foraging and breeding habitat, resulting in lowered overall carrying capacity from both loss of habitat and reduced prey base. The project would have a net positive effect on those species associated with open-water habitats such as western pond turtle, beaver, aquatic garter snake, muskrat, and various bat species as well as osprey (Fish and Wildlife Service, 1990).

Impacts would occur to breeding, wintering, and migrating birds associated with forests, woodlands, shrublands, and riparian zones. Habitat would be permanently lost for such species as woodpeckers, warblers, western meadowlark, upland gamebirds, and raptors.

The open water of the reservoir would create 680 acres of habitat for migratory waterfowl. Waterfowl species would nest in dense cover that would become established adjacent to the pool, especially at the upper end of the reservoir. Osprey, bald eagles, and other fish-eating birds would be expected to forage on the increased fish populations. Several pairs of osprey and bald eagles could establish nest territories in the area. The flooded timber areas in Walker Creek arm would also produce increased forage, nesting, and roosting areas for swallows, woodpeckers, wood ducks, kingfishers, and cormorants. Herons, gulls, numerous species of diving ducks, terns, grebes, and shorebirds would use the reservoir and adjacent habitats (marshes, mudflats, and shorelines) that would be created with the project (Fish and Wildlife Service, 1990).

All terrestrial wildlife use of the reservoir inundation areas and the road relocation areas would be lost, while the quarry would be reclaimed and provide some wildlife use. The recreation sites would continue to provide wildlife use, but at reduced acreages and values.

The HEP demonstrated impacts to wildlife in terms of changes to the AAHU's. These changes are determined by comparing future without-the-project conditions against future with-the-project. The reduction of AAHU's are the product of the reduction of acres of terrestrial vegetation cover-types and a partial degradation of certain habitat values, as expressed in habitat suitability indices (HSI). The HEP study also recognized the gained habitat values that would be associated with the upper reservoir's aquatic environment as indicated by increases in AAHU's for osprey and western pond turtle. Changes in AAHU's with the project for each of the evaluation species are summarized in Table 3-14-3 (Fish and Wildlife Service, 1990).

Table 3-14-3. Net Changes in Average Annual Habitat Units (AAHU's) for the Milltown Hill Project.

Species	AAHU's Without Project	AAHU's With Project	Net Change
Downy Woodpecker	349	190	-159
Western meadowlark	252	90	-162
Yellow warbler	109	10	-99
Wild turkey	584	290	-294
Black-tailed deer	1,005	510	-495
Osprey	0	214	+214
Western pond turtle	8	64	+56

Changes assume both direct losses with the reservoir and indirect losses with road relocation, borrow sites, and recreation developments. Also assumes timber retention in portions of the reservoir and wetlands development at the upper end of the reservoir.

Source: Fish and Wildlife Service, 1990.

3.1.14.3 Mitigation of Impacts to Wildlife

Those areas temporarily disturbed by construction activities would be recontoured and revegetated after construction to hasten rehabilitation of the habitat. Native vegetation would be used to the extent possible (Fish and Wildlife Service, 1990).

The loss of 173 acres of riparian vegetation by reservoir inundation, would be mitigated by habitat enhancement on portions of Elk Creek downstream of the project site. Restoration would include plantings and/or fencing in areas where vegetation has been impacted by grazing, brush clearing, and other human activities. In addition, the County would develop a riparian program to identify problem areas and implement remediation efforts with landowners (Fish and Wildlife Service, 1990).

The 28 acres of wetlands in the agricultural area below the damsite would not be affected. The loss of 31 acres in the reservoir area would be mitigated by development of wetlands in the south end of the reservoir. The development of 10 to 15 ponds south of the causeway in this area of the reservoir would result in about 23 acres of wetlands (Figure 2-6). These areas would be contoured and planted with native plants to produce high quality wetlands (also, See: Section 3.1.11 Vegetation). The presence of the island would further increase shoreline areas where wetland vegetation would be planted (Fish and Wildlife Service, 1990).

The timber (about 90 acres) in the north part of the reservoir and in the Walker Creek arm of the reservoir would be left uncut, except for trees which could be dangerous to recreationists, to provide for wildlife use. This would provide an area where osprey platforms and duck boxes would be built.

The loss of game species habitat values (495 AAHU's for black-tailed deer and 294 AAHU's for wild turkey), would be mitigated by securing 767 acres of Columbian white-tailed deer habitat off-site and within the core area for deer. Douglas County would be responsible for initiating landowner incentives, local planning and zoning ordinances, and the active involvement of private organizations and public agencies to secure habitat.

The upstream end of the reservoir would be developed specifically as a wildlife habitat area (Figure 2-5). It would provide both game and nongame mitigation values. About 200 acres would be acquired for habitat improvements and about 120 acres of pool would be maintained for high quality wildlife habitat. This area would support hunting (bird and waterfowl) and other wildlife-oriented recreation. It is anticipated that there would be about 500 hunter-days and 6,500 visitor days (bird watching, photography, and nature hikes) in the wildlife project area each year. Habitat developments and restrictions in the wildlife area include the following:

- No livestock would be allowed.
- Planting of mast producing plants along field edges and fence rows would serve as buffers, escape cover, and forage.
- Snag development and placement of nest boxes and platforms in about 50 acres of timbered areas.
- Development of about 23 acres of permanent, shallow-water ponds and wetland areas at the upper end of the reservoir.
- Creation of submerged piles of woody debris of in-water structural diversity in the mid-pool area.

The HEP analysis demonstrated that the onsite mitigation would provide overall net benefits for two of the evaluation species, the osprey and western pond turtle (Table 3-14-4). The U.S. Fish and Wildlife Service and the Oregon Department of Fish and Wildlife agreed that this mitigation is adequate to compensate for losses to nongame species. However, additional mitigation measures would be required for game species (black-tailed deer and wild turkey) (Fish and Wildlife Service, 1990).

Table 3-14-4. Net results on the onsite mitigation actions.

Species	Net change AAHU's with the project	Net AAHU's with mitigation	Difference
Downy woodpecker	-159	+44	-115
Western meadowlark	-162	+18	-144
Yellow warbler	-99	0	-99
Wild turkey	-294	+92	-202
Black-tailed deer	-495	+86	-409
Osprey	+214	+33	+247
Pond turtle	+56	0	+56

Source: Fish and Wildlife Service, 1990.

Onsite mitigation measures for black-tailed deer and wild turkey are limited because existing habitat quality is already high, and the limiting factor of human disturbance which would not be easily improved with management. The interagency HEP team concurred that game species losses could be mitigated off-site by securing habitat for the endangered Columbian white-tailed deer (See: Section 3.1.16, Threatened and Endangered Species). Although this would be out-of-kind mitigation, the HEP team believed that actions which would secure habitat for the white-tailed deer would also provide habitat values for black-tailed deer and wild turkey

(Fish and Wildlife Service, 1990).

Optimal habitat for Columbian white-tailed deer is oak and riparian woodland with a well-developed understory adjacent to grassland. This habitat supports a diversity of nongame wildlife in addition to black-tailed deer and wild turkey. Securing habitat is the only requirement that remains to be met for delisting the species. Presently, about 2,000 acres of secured habitat exist within Federal, County and State lands. The recovery plan identifies a need for 5,500 acres of secured habitat. The additional 3,500 acres could be secured through lease agreements, easements, zone ordinances, and covenants on deeds developed with landowners or through outright acquisition (Fish and Wildlife Service, 1990).

The HEP team determined that securing 767 acres of Columbian white-tailed deer habitat would compensate for the habitat losses of black-tailed deer and turkey.

3.1.15 Fisheries Resources

3.1.15.1 Existing Fisheries Resources

Elk Creek meanders most of its 45 mile length and has a relatively low gradient (less than one percent). Substrate is largely bedrock with little gravel accumulation. It is characterized by a large number of pools and runs with only a few riffles (estimated pool to riffle ratio of 9 to 1). In addition, woody debris and other instream structures are notably absent from the creek except in the uppermost 6 miles. Riparian vegetation is generally present and typically provides excellent shading during summer, especially above Drain (river mile 24). Downstream from Drain, the channel widens and shading is reduced to only a portion of the stream channel (Craven, 1989).

The lack of gravels, riffles, and other instream structures in Elk Creek limits habitat diversity for the production of fish and other aquatic organisms. Spawning and rearing habitat for anadromous and resident fish is sparse, especially during low flows. Late summer flows in Elk Creek are generally less than 5 cfs, and frequently approach 0 cfs, whereas average winter and spring flows are about 800-1,000 cfs at the mouth. The low summer flows and warm climate combine to create warm water temperatures that frequently exceed 75 °F downstream from Drain (Craven, 1989).

The general lack of gravels, other instream structures, and low summer flows indicate that production of invertebrates in the main stem of Elk Creek is probably very low. Most stream productivity is assumed to be from algae and terrestrial invertebrates, with some invertebrate production associated with leaf fall and other detrital input.

Bank erosion is evident (especially between river mile 27 to 35) with steep, high cut banks and mud/silt substrate that contribute to turbidity and sedimentation. During high flow, the water has a very high sediment load. The subbasin has a significant amount of clay and colloidal material. Land and forest management practices in the watershed strongly influence sedimentation and turbidity.

In addition to poor habitat conditions, there is one small irrigation dam (Cunningham Dam) across Elk Creek at river mile 17.5 that could be affecting anadromous fish use of the system. The structure has no fish facilities and there is no record of passage information. It is likely that fish passage could be delayed or blocked at the dam, especially during low flow periods. Walker Creek, a tributary located upstream of the proposed damsite, has a near vertical waterfall near the mouth that is a natural barrier to upstream passage for fish (Craven, 1989).

Anadromous fish reported to use Elk Creek and its tributaries include fall chinook salmon, coho salmon, winter steelhead trout and sea-run cutthroat trout (Table 3-15-1). The most recent estimates of run size for these species are 15 fall chinook, 500 coho, and 500 winter steelhead (Craven, 1990). No estimates for sea-run cutthroat are available. Of these totals, more than 90 percent of the total anadromous fish production occurs in the tributaries of Elk Creek, with only 5 percent occurring in the uppermost reaches of the mainstem. The exception to this is fall chinook, which occurs only in the lower 10 miles of the main stem. Major tributaries used by anadromous fish include Big Tom Folly, Brush, Pass, and Yoncalla Creeks. In addition to anadromous fish, other fish that have been found in Elk Creek include rainbow trout, reticulate sculpin, Umpqua chub, redside shiner, lamprey, and speckled dace (Table 3-15-1).

Table 3-15-1. Fish Species Reported in Elk Creek.

Reticulate sculpin (*Cottus perplexus*)
Coho (*Oncorhynchus kisutch*)
Redshine shiner (*Richardsonius occulus*)
Rainbow trout (*Oncorhynchus mykiss*)
Cutthroat trout (*Oncorhynchus clarkii*)
Umpqua chub (*Oregonichthys kalawetseti*)
Winter Steelhead (*Oncorhynchus gairdneri*)
Fall Chinook (*Oncorhynchus tshawytscha*)
Large scale sucker (*Catostomus macrocheilus*)
Threespine stickleback (*Gasteroteus aculeatus*)
Yellow bullhead (*Ictalurus natalis*)
Smallmouth bass (*Micropterus dolomieui*)
Speckled dace (*Rhinichths occulus*)
Lamprey (*Lampetra spp.*)

Source: Craven, 1989; Doug Markle, pers. comm., Department of Fish and Wildlife, Oregon State University.

Recreational use of the fishery resources of Elk Creek is limited because salmon and steelhead fishing is not permitted, and only local use is made of trout fishing opportunities in the mainstem and some of the tributaries. A total of about 2,000 angler-days presently occur in the subbasin, mostly for rainbow trout (Craven, 1989).

3.1.15.2 Impacts to Fisheries Resources and Habitat

3.1.15.2.1 Construction

The dam would be located at river mile 39.4 on Elk Creek and would inundate about 4 1/2 miles of the main-stem and 2 miles of tributaries. Tributaries upstream of the proposed dam include Walker, Lane, and Shingle Mill Creeks, and several small, seasonal streams. Fish passage facilities are not planned for the dam; thus, anadromous fish use of areas upstream of the dam would be lost. Based on surveys conducted in the area of the proposed reservoir and the analysis of fishery benefits and impacts, it is estimated that the production of about 50 coho and 50 winter steelhead would be lost annually. Resident fish are expected to continue to exist in the new reservoir.

Resident game and non-game species as well as anadromous species could be affected during construction in the reservoir pool area and downstream. Project activities that could adversely affect fisheries resources would be those activities that would provide barriers to movement or affect water quality, such as the coffer dams and diversion at the damsite, road crossing on Elk Creek, and erosion of sediment or release of contaminates into Elk Creek. Impacts due to these activities are expected to be minor and short-term.

The pipeline to the service area would cross Elk Creek and various tributaries. There would be only minor, short-term impacts on fisheries because construction would occur during low or no flow periods (See: Section 3.1.9, Water Quality).

Water quality impacts, such as increased sedimentation and turbidity from construction in or near the stream would occur. These activities are not expected to significantly affect fisheries resources because of the anticipated short-term nature of the work which would be conducted during summer low flow months.

3.1.15.2.2 Operation

The reservoir would provide good habitat conditions for rainbow trout and/or warm water sport fish. Management by the ODFW would probably emphasize warm water species. Retention of 90 acres of flooded timber in the lower reservoir and in the upper end of the reservoir above the relocated county road would provide good cover and nesting conditions for largemouth bass, bluegill, and bullhead catfish. The development of habitat features (i.e., brush piles, snags, and other large woody debris) and plantings of emergent vegetation in the upper end of the reservoir would also improve habitat for warm water fish. Shoreline spawners, such as warm water fish, could be adversely affected by reservoir pool drawdowns during irrigation season.

Coastal cutthroat trout are native to Elk Creek and there is a good possibility that they will survive in the reservoir and continue to spawn in Elk Creek above the reservoir and in some of the tributaries (Lane, Shingle Mill, and Walker Creeks).

The reservoir trout fishery could be supplemented by plantings of rainbow trout and bass. This is done at nearby Cottage Grove Lake, a Corps of Engineers reservoir on the Coast Fork of the Willamette River. The bass fishery at the lake is very popular and is managed as a catch-and-release trophy fishery by ODFW. This management reduces the potential for mercury accumulation in humans from eating mature fish which may contain concentrated levels of mercury (Fish and Wildlife Service, 1990).

Due to leaching of mercury ores in the watershed, Cottage Grove Lake has higher than acceptable concentrations of mercury. Only catchable-size rainbow trout are planted at Cottage Grove because of a concern for mercury concentrations in the fish. A similar concern was expressed for the proposed project because of an abandoned mercury mine near Lane Creek. Mercury contamination has been noted in fish from Cottage Grove Lake since 1973. Mercury levels in cutthroat trout in 1975 were 0.26 ppm. Unpublished Oregon Department of Environmental Quality (DEQ) data show that brown bullhead and largemouth bass contained mercury levels in edible portions of flesh of 1.0 ppm and 0.84 ppm, respectively. Therefore, fishermen were warned not to eat more than 1 pound of fish out of the lake each week. DEQ has continued to monitor mercury levels in Cottage Grove Lake; levels appear to be stable and are not considered a health hazard to humans involved in swimming, water skiing, or other water contact activities (Fish and Wildlife Service, 1990).

Because of the concern that similar problems could occur in the Elk Creek drainage, fish from Elk Creek in the proposed reservoir area were sampled for mercury contamination. Mercury concentrations of 16 ppb and 3 ppb were found in two of the three samples taken. EPA recommends that mercury concentrations not exceed 146 ppb for the protection of human health from the toxic properties of mercury through water and contaminated aquatic organisms. While the data from Elk Creek represents very limited sampling, the values indicate that mercury levels in fish in the new reservoir could be higher than background levels found in most other western Oregon waters, but that the levels would probably not equal or exceed those found at Cottage Grove Lake (Fish and

Wildlife Service, 1990).

Sport fishing at Cottage Grove Lake accounted for about 52,800 angler-days in 1985 for the 1,137-acre pool. The intensity of fishing use at the proposed project is expected to be less because there would not be the same level of recreational facility development and the reservoir would have a summer drawdown period when the surface area would be decreasing. Operational studies for the project show an average pool elevation of 736 feet and a surface area of 256 acres during September. Also, management actions would restrict boating access to certain areas of the reservoir. The area upstream of the relocated County Road #8 would be nonmotorized access only, while the areas near the dam and in the Walker Creek areas would be restricted to certain motor sizes. Recreation sport fishing at Milltown Hill is expected to average about 6,500 angler-days annually. This assumes an initial stocking of largemouth bass by the ODFW, and annual stocking of about 3,000 to 5,000 catchable rainbow trout. The warm water fishery is assumed to be self-sustainable and not require future treatment or additional stocking (Fish and Wildlife Service, 1990).

The reservoir would store 24,143 acre-feet of water at normal full pool. Releases would be made for the purposes of irrigation, municipal and industrial water supply and fish enhancement. Up to 7,737 acre-feet of reservoir space would be specifically dedicated to downstream fish enhancement (See: Section 3.1.8, Water Quantity). The project would store water, except for statutory releases and spillway flows, during high flow periods of late fall, winter, and early spring. Storage of water during the high flow period would not adversely affect aquatic resources downstream because releases would still occur above those necessary to protect aquatic life. Although there would be 7,737 acre-feet dedicated to fish enhancement, the actual amount available would depend on water year. For example, hydrological analyses for a 65 year period show that the quantity of water available varies. The 50, 75, and 90% exceedence are 6,500, 6,000, and 5,000 acre-feet, respectively (See: Figure 3-8-5, Section 3.1.8, Water Quantity). Although irrigation return flows are anticipated, they are not included in the storage for fish enhancement.

Flow releases would occur at the dam for municipal, industrial and irrigation demands during summer months. Although these are considered project releases, the flows would benefit fisheries resources as well, and would be an improvement over existing conditions of naturally low summer and fall flows (See: Section 3.1.8, Water Quantity). In addition to project flows, there would be fish enhancement flows available for release during summer and fall months (See: Section 3.1.8, Water Quantity). These flows would be released as desired by agreement between ODFW and County. With control over the temperature of the released water, the cooler water and increased flows would substantially improve rearing habitat for anadromous and resident fish in the mainstem of Elk

Creek below the dam. In addition, the Yoncalla Valley pipeline would be used to deliver water to the lower 2.5 miles of Yoncalla Creek for streamflow enhancement during the same low flow period.

A low water year (1977) and an average water year (1957) were selected for monthly comparisons of flow during the summer months at various locations (See: Tables 3-8-5 and 3-8-6, Section 3.1.8, Water Quantity). Critical months when flows are low (0-5 cfs) are usually July through September or October, depending on water year. The existing (natural) flows are shown in comparison to project flows, excluding fish enhancement flows. Fish enhancement flows available for each year are also shown. The total project flow is the flow released to satisfy downstream water demands as well as enhancement flows for fisheries resources. Stored releases for fish enhancement would be protected from appropriation by an instream water right that the Oregon Department of Fish and Wildlife would receive from the Water Resources Department.

The release of enhancement flows for fisheries resources would be flexible to allow the ODFW to manage the resource as necessary in any given year. The time of release would be at the discretion of ODFW and would vary from year to year, depending on management objectives. Flow release could be made to optimize spawning and rearing habitat conditions, primarily for coho salmon, chinook salmon, and winter steelhead. Flows also could be released to provide passage or for attraction of fish into Elk Creek. Releases would be made to provide either additional flows per se or flows to modify the temperature regime or both.

Reservoir water temperatures were simulated for several years (1977 and 1987-1990). The results of simulation show that temperatures of reservoir multiport releases could be maintained between about 40 and 48 degrees F until about October, depending on water year and air temperature regime. By October, the reservoir is low and water temperatures would increase rapidly to about 55°F to 65°F level by November (1977). In October and November, ambient air temperatures are low and stream water temperatures would not be expected to increase. Some decrease could be expected (See: Section 3.1.9, Water Quality).

The reservoir release temperatures were similar for all years modelled except for the high temperature in September 1977. The average reservoir release temperature for each time period modelled was used as an input temperature for the stream model. For September a high temperature (63 °F), representing 1977, was used and a lower temperature (52 °F) representing other years was used. The computer modeling of stream water temperatures indicated that water temperatures would be less than 65°F between the dam to about river mile 10. Downstream of river mile 10, temperature could be above 65°F, depending on year and flow available for enhancement. Releases from the fish enhancement storage would be needed to keep temperature between the dam and river mile 10 less than 65°F, after about July 1. Temperatures could exceed 65°F between Drain and Elkton and could approach 70°F or higher at the mouth.

Increased flow and lowered temperature would significantly enhance fisheries habitat, but existing poor habitat conditions (substrate) in Elk Creek could continue to limit fish production. Accordingly, additional enhancement efforts (Figures 2-5 and 2-6) would be undertaken by Douglas County and would include:

- Placement of 8,000 square feet of spawning gravel one foot deep and provision of woody debris in Elk Creek between RM 39.4 (dam site) and RM 34.4.
- Placement of 33,000 square feet of spawning gravel one foot deep and provision of woody debris in Elk Creek between RM 34.4 and the mouth.
- Placement of a total of 4,000 square feet of spawning gravel one foot deep in the lower reaches of Adams and Yoncalla Creeks.
- Riparian enhancement on 1 to 2 miles of stream to reduce erosion and to provide riparian vegetation.
- Potential redesign of the Cunningham Dam at RM 17.5 to allow for unrestricted fish passage.
- Supplementation of existing anadromous fish populations with juvenile presmolts for at least the first 5 years of project operation.

The schedule for these activities is shown in Figure 2.8, Section 2.2.2.15, Construction Schedule and Work Sequence.

The combination of habitat improvements, increased flows, and improved temperatures would substantially enhance spawning and rearing conditions for anadromous fish in Elk Creek mainstem and in Yoncalla Creek. Also, rearing habitat for anadromous fish that use the tributary stream to spawn would be enhanced as they move into Elk Creek. The spawning escapement of anadromous fish to the Elk Creek system would be about 2,975 adults annually. Table 3-15-2 summarizes the increased spawning escapement of anadromous fish that could occur with the project.

Table 3-15-2. Estimated Increased Spawning Escapement of Anadromous Fish with the Milltown Hill Project, Douglas County, Oregon.

Enhancement Item	Winter steelhead	coho	Fall Chinook
Intensive enhancement, mainstem RM 34.4-39.4	800	800	0
Mainstem below RM 34.1[1]	150	150	225
Intensive enhancement of Adams and Yoncalla Creeks	300	300	0
Increase rearing quality in mainstem for tributary juveniles	250	250	0
Subtotal	1,500	1,500	225
Losses upstream of dam	50	50	0
Net change	1,450	1,450	225

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[1] Main stem benefits would also include an increased spawning escapement of 50 sea-run cutthroat trout if adequate temperatures are maintained below RM 27.

Source: Modified from Craven, 1990.

The commercial and sport harvest was estimated based on the escapement, catch to escapement ratios, and commercial to sport harvest ratios (Myers, 1991). Table 3-15-3 exhibits the estimated contribution of winter steelhead (2,900), coho (5,802), fall chinook (1,100), and sea-run cutthroat (100).

Table 3-15-3. Estimated Commercial and Sport Fishery Harvest.

Species	Harvest Commercial	Harvest Sport	Total
Winter Steelhead	-	2,900	2,900
Coho	3,828	1,974	5,802
Fall Chinook	825	275	1,100
Sea-run Cutthroat	-	100	100
		TOTAL	9,902

Source: Myers, 1991.

3.1.15.3 Mitigation of Impacts to Fisheries Resources

Water quality impacts would be minimized during construction in the reservoir pool area. Various measures would be implemented to reduce runoff of erosional material. Construction in the stream would be minimized and would occur during low flow periods. Periodic discharge flows from settling ponds (less than 1/2 cfs periodically) would be monitored to ensure maintenance of water quality. (See: Section 3.1.9, Water Quality). Construction impacts to existing fisheries resources are considered minor and short-term.

Operation of the proposed project would substantially enhance anadromous fish habitat in the Elk Creek subbasin. A small portion of the subbasin's habitat would be lost upstream of the dam, but increased production from improved flows and temperatures below the dam, in conjunction with the proposed habitat improvements, would more than offset the losses. The new resident fishery in the reservoir, also due in part to habitat improvements, would more than offset losses to the relatively small existing resident trout fishery (Fish and Wildlife Service, 1990).

The analysis of anadromous fish benefits assumes that flows and temperatures would be suitable for spawning and rearing and that they could be managed to optimize habitat conditions. A detailed monitoring and evaluation program would be developed and implemented as part of the project. The program would specify the objective to be achieved, monitoring methods to be used, and how changes to the fish enhancement program would be coordinated and implemented. Results from monitoring would be used to retain strategies that are working and to modify those that are not.

The monitoring and evaluation program would also be used to finalize the locations of some of the habitat improvement measures. Initial habitat improvements would be accomplished between Boswell Springs and the dam and in Yoncalla Creek. The locations of habitat improvements on the mainstem of Elk Creek below Boswell Springs would be based on monitoring temperature and flow conditions that develop during project operation. The monitoring program would include evaluation of physical, habitat, and biological parameters and would be developed in coordination with Oregon Department of Fish and Wildlife, National Marine Fisheries Service, and Fish and Wildlife Service.

The sequence and timing of implementing the fish enhancement measures are also important. Supplementation with juveniles would be accomplished during project construction (See: Figure 2.8, Section 2.2.2.15, Construction Schedule and Work Sequence). Juvenile releases would include proper acclimation procedures to ensure improved survival. Habitat improvements would be constructed along with project construction so that enhanced fish production can be fully realized as soon as project operations begin. Supplementation would continue through the early years of project operation to assure early achievement of the fish enhancement objectives. These activities would be the responsibility of Douglas County.

Samples of fish will be periodically taken from the reservoir and tested for mercury contamination. A sampling program and schedule will be developed by Douglas County for a 3 year period to evaluate levels of mercury. Results will be evaluated yearly and at the end of the 3-year study an evaluation will be made whether to continue with further analysis on a yearly basis or to decrease the frequency of sampling.

The supplementation program would be developed by Douglas County in consultation with Oregon Department of Fish and Wildlife, Fish and Wildlife Service, and National Marine Fisheries Service. Coho, fall chinook salmon, and winter steelhead would be target species for consideration. Although chinook would not likely go above river mile 10, coho and steelhead may reach the base of the dam. Coho and steelhead would be trapped during project construction and removed to a hatchery designated by Oregon Department of Fish and Wildlife for egg taking. Fish would be reared and released near the base of the dam or at other locations as directed by Department of Fish and Wildlife. These fish would be used for supplementation purposes. The source of fall chinook for supplementation would be determined during project construction.

3.1.16 Threatened and Endangered Species

Pursuant to the 1973 Endangered Species Act, as amended, Bureau of Reclamation initiated Section 7 Consultation by requesting from the Fish and Wildlife Service a list of threatened and endangered species that may occur in the project area. A request was made by the Bureau of Reclamation in 1986 and again in 1991. The Bureau of Reclamation received 2 lists that included species that could occur in the project area. These are the Columbian white-tailed deer (endangered), the bald eagle (threatened), and the Northern spotted owl (threatened). The Fish and Wildlife Service also included candidate species. These are a plant species (rough allocarya), a fish (umpqua chub), and a turtle (western pond turtle). The Oregon chub (Hybopsis crameri) was cited by the Fish and wildlife Service as a Category 2 species in their 1986 correspondence. In their 1991 correspondence, they substituted the Umpqua chub. In addition, the Oregon Natural Heritage Program was contacted for a search of their records. They did not have any threatened or endangered species in their records for the project area. (See: Appendix F, Threatened and Endangered Species).

3.1.16.1 Listed Species

3.1.16.1.2 Columbian White-Tailed Deer

A population of Columbian white-tailed deer, known as the "Roseburg Population," occurs in Douglas County mainly along the North Umpqua River between Glide and Wilbur. The reservoir pool area has not been identified to be in the core habitat by Oregon Department of Fish and Wildlife. The habitat is not considered to be critical by the Fish and Wildlife Service (Fish and Wildlife Service, 1990). The population has been expanding its core range northward and could conceivably extend its range into the Elk Creek drainage. Individual white-tailed deer that have been marked to study their distribution have been recently observed in the Elk Creek drainage near the reservoir site (pers. comm. George Kister, ODFW, Roseburg District).

Columbian white-tailed deer inhabit a variety of habitat types including grass-shrub, oak woodlands and conifers. Lowland riparian zones are probably the most important habitat type for all life stages of the species and serve as corridors for dispersal and geographic expansion. Understory shrub vegetation is an especially important component of their habitat (Fish and Wildlife Service, 1990).

The Roseburg population is currently estimated to be about 4,000 white-tailed deer. This level exceeds the requirements for downlisting the species from endangered to threatened. The only requirement that has to be met for delisting the species is to provide 5,500 acres of secured habitat. Habitat is considered to be secured only if it is protected from adverse human activities (e.g., heavy unregulated grazing by domestic animals and clearing of woody plants, for example) in the foreseeable future, and is relatively safe from natural phenomena that would destroy its value to Columbian white-tailed deer. The Columbian White-tailed Deer Recovery Team has formulated an approach for securing the required habitat. Since most core habitat is on private land, the most effective way of securing habitat is by obtaining cooperative agreements such as covenants on deeds or perpetual conservation easements (Fish and Wildlife Service, 1990).

3.1.16.1.3 Bald Eagle

Bald eagles nest and winter throughout Oregon. There have been about 11 active bald eagle nesting territories in Douglas County, including one on the North Umpqua River northeast of Roseburg, but they are not known to use the project area. According to the Pacific Bald Eagle Recovery Plan, the primary threats to bald eagle populations in the Umpqua Basin include logging, human disturbance, and shooting (Fish and Wildlife Service, 1990).

3.1.16.1.4 Northern Spotted Owl

The project area is within the range of the Northern spotted owl. A survey was initiated in 1991 by Douglas County to determine if owls exist within 1 1/2 miles of the proposed dam site. No owls were located. Section 7 Consultation is in process and will be completed prior to publication of the final environmental impact statement. The Fish and Wildlife Service has published in the Federal Register a Revised Proposed Determination of Critical Habitat for the Northern spotted owl (FR Vol 56, No. 156). This revised proposed determination eliminates all private lands, tribal lands and most state-owned lands which were listed in the May 6, 1991 designation. The August 13, 1991 determination indicates no federal lands in the Milltown Hill Project area are classified as critical habitat for the owl. The Fish and Wildlife Service proposes to publish a final decision on the proposed designation of critical habitat for the owl in December, 1991.

3.1.16.2 Biological Assessment

For compliance with Section 7 of the Endangered Species Act of 1973, Bureau of Reclamation prepared a biological assessment for the listed species (November 5, 1987) which concluded that the project would not negatively affect bald eagles. Since the Columbian white-tailed deer was not found in the project area, the project would have no impact on existing populations. The impact evaluations for bald eagles and Columbian white-tailed deer in 1987 were as follows:

> Following construction, bald eagles may be attracted to the reservoir due to an increased forage base of fish and waterbirds. Bald eagles could nest in some of the larger trees left on the timbered ridges above the project site.
>
> Habitat that is potentially suitable for the Columbian white-tailed deer would be reduced 680 acres by reservoir inundation. This habitat is also suitable for black-tailed deer.

The Fish and Wildlife Service concurred with this conclusion. The biological assessment has been updated and concurrence by the Fish and Wildlife Service will be obtained prior to publication of the final environmental impact statement and record of decision.

Surveys were conducted for Northern spotted owl in 1991. No owls were located. A biological assessment for the Northern spotted owl has been prepared and concurrence by the Fish and Wildlife Service will be obtained prior to publication of the final environmental impact statement and record of decision.

3.1.16.3 Unlisted and Candidate Species

3.1.16.3.1 Plants

No threatened and endangered plant species have been reported on the project area by Fish and Wildlife Service or Oregon Natural Heritage Program. Although the Pacific yew is not a Federal listed species, County requested an evaluation because of it's importance in medical research. Pacific yew trees have been located on BLM lands in the project area. These trees have been harvested (pers. comm., Lowell Hayes, Bureau of Land Management, September 5, 1991).

Rough allocarya is a Federal Candidate Species (Category 1). A Category 1 taxa is one for which the Fish and Wildlife Service has sufficient biological information to support a proposal to list as endangered or threatened. The species has not been reported in the area by Fish and Wildlife Service or the Oregon Natural Heritage Program, however a survey would be conducted within any affected potential habitat. If the species is found to occur in the inundation zone, consultation would be initiated with the Fish and Wildlife Service.

3.1.16.3.2 Umpqua Chub

The Umpqua chub occurs in a spotty distribution pattern throughout the Umpqua River system, including the lower reaches of Elk Creek. It is a Federal Candidate Species (Category 2) but is not listed by the State. A Category 2 species is one for which existing information indicates may warrant listing, but for which substantial biological information to support a proposed rule is lacking (Fish and Wildlife Service, 1991). It is possible that the anticipated cooler water in Elk Creek would improve the habitat for Umpqua chub, however there is concern that reduced flows during spring may reduce off-channel habitat. Also, introduction of warmwater fishes from the Milltown Hill Reservoir may increase predation on the Umpqua chub.

If the Umpqua chub is proposed for listing, or listed prior to construction, consultation with the Fish and Wildlife Service would be reinitiated. Following construction, downstream populations of Umpqua chub would be monitored and measures be taken to insure the conservation of the species in Elk Creek in coordination with ODFW and the Fish and Wildlife Service.

3.1.16.3.3 Western Pond Turtle

The western pond turtle is a Federal Candidate Species (Category 2). The species has been located in the Elk Creek drainage. The presence of the reservoir, backwater sloughs, and the wetlands in the southern part of the reservoir should enhance the habitat for this species.

If the western pond turtle is proposed for listing, or listed prior to construction, consultation with the Fish and Wildlife Service would be reinitiated. Following construction, populations of western pond turtle would be monitored and measures taken to insure the conservation of the species in Elk Creek in coordination with ODFW and the Fish and Wildlife Service.

3.1.17 Recreation

3.1.17.1 Existing Recreation Conditions

There are no developed public or private recreational facilities in the reservoir pool area. Recreational activities on Elk Creek are relatively limited due to restricted access. Low water levels during summer are not conducive to attracting people to the creek. Douglas County parks located in the Elk Creek subbasin are:

- Pass Creek Park, located near Curtin on Interstate 5, 8 miles north of the project area, contains 30 camping units, picnicking, playground, fireplaces, showers and toilets.

- Anna Drain Park, located in the city of Drain, and maintained by the city, is a small park, having a playground, picnicking, drinking water and toilet facilities.

Dorena Lake and Cottage Grove Lake, two large impoundments, are located in Lane County, approximately 30 miles north of the project area. Plat I Reservoir and Cooper Creek Reservoir are located near Sutherlin about 20 miles south. These lakes have picnicking and camping facilities, and provide fishing and other flat water recreational opportunities.

3.1.17.2 Impacts to Recreation

Douglas County would construct 2 recreation facilities on the shores of the Milltown Hill Reservoir (Figure 2-4). The larger facility, located on the east shore, would provide the following:

- Access roads
- Caretaker facilities
- Launch ramp and trolley dock
- Individual and group picnic sites
- Restrooms

- Parking for 61 single vehicles and 40 vehicles with trailers
- Pavilion with electrical outlets
- Well and water treatment facilities
- Overnight camping area (future development)

The second facility would be constructed on the west shore of the reservoir. It would consist of a boat ramp and parking for 29 vehicles with trailers, or 62 single vehicles, pit toilets and 5 picnic sites (Horn, 1990).

The reservoir would experience about 53,000 recreational use-days per year (Table 3-17-1). The anadromous sport fishery in the Umpqua River and in the ocean would be enhanced by the project. Sport catch is estimated to be about 5,250 winter steelhead, coho, fall chinook and sea-run cutthroat (See: 3.1.15, Fisheries Resources).

Table 3-17-1. Anticipated Reservoir Recreation Use.

Facility Based Use

Recreation	Number Days
2 Boat Ramps1/	10,000
52 Picnic Units	20,000
Fishing Days	6,500
Subtotal	36,500
Non-Facility Based Use 2\	16,500
Total	53,000

1) Assumes east ramp would receive the majority of spring/early summer use, and west ramp would receive moderate spring/early summer and late summer use.

2) Sightseeing, hiking, wildlife observation, dispersed picnicking.

Source: Bureau of Reclamation, 1991.

Adverse impacts to recreational activities would be the loss of an estimated 100 hunter-days annually for upland game in the reservoir pool area. In addition, an estimated 1,000 angler-days would be lost annually in the 4.5 miles of Elk Creek which would be inundated by the reservoir.

3.1.17.3 Mitigation

Impacts to the existing limited sport fishery would be mitigated by the new warm-water and trout fishery in the reservoir. Improvement of fish habitat downstream from the dam would benefit the trout fishery and would more than offset the losses. The project would provide a new and significant source of public recreation in northern Douglas County. The loss of 100 hunter-days annually for upland game would be mitigated by the 500 hunter-days for bird and waterfowl hunting (See: Section 3.1.14.3 Mitigation of Impacts to Wildlife). The reservoir would have the potential of attracting large numbers of waterfowl. The harvest of migratory waterfowl would offset the loss of existing upland game hunting opportunities.

3.1.18 Cultural Resources

3.1.18.1 Existing Cultural Resources

Little is known of the prehistoric inhabitants of the Umpqua River drainage. Archeological excavations indicate the area has been in use since the Paleo-Indian period (before 10,000 years ago). However, archeological evidence of occupation does not become abundant until about 6,000 to 4,000 years ago. Available information indicates that prehistoric inhabitants followed a settlement-subsistence system involving seasonal migration from lowland villages to upland task-specific camps. At Euro-American contact around 1810, the resident Native Americans were practicing a hunting-gathering economy that utilized available fish, game, and plant resources (Beckham and Minor, 1988).

The Milltown Hill reservoir area and other project lands would be associated primarily with the lowland aspect of this settlement-subsistence system. Valley terraces above the flood elevation may contain remnants of winter village sites spanning thousands of years of use. Remnants of short term camps may also be present where inhabitants returned to harvest seasonally available plant foods or to catch anadromous fish.

Upper Elk Creek drew Euro-American settlers as early as 1855. By 1866, five donation land claims had been patented within the proposed reservoir pool area, and 16 families lived in the general area. Around 1870, the Elkhead Mine was opened and remained in operation through 1971. However, census records indicate that farming and stockraising have always been the primary economic activity for area residents. In 1877, the Elkhead Post Office was opened, and in 1886 a school was built. The small town of Elkhead subsequently grew around these structures and remains today as a community of 10 to 12 residences (Beckham and Minor, 1988).

In 1988, a Class I literature search was conducted to identify the potential cultural resources sites or structures in or near the project area (Beckham and Minor, 1988). Eighteen historic structures, features, and homestead locations were identified from document research. Local residents also reported the presence of two prehistoric archeological sites within the reservoir pool area.

In 1989, a Class III cultural resources survey was completed for the reservoir pool and nearby areas and for the pipeline (Minor and Beckham, 1990). Heavy vegetation obscured the ground surface during the survey and may have prevented detection of some archeological sites. The terrace proposed for wildlife mitigation may have a high potential to contain unrecorded archeological sites.

Prehistoric archeological material was discovered in three locations where the vegetation had been removed (recorded as sites 35DO449, DO450, and DO451). Only a few flakes from stone tool manufacture were found at each site. A fourth prehistoric site was reported by local residents to be present in a farmyard near Elkhead. Two historic archeological sites were recorded, both apparently remnants of homesteads (Minor and Beckham, 1991).

The Class III inventory recorded all standing structures approximately 50 years or older within the reservoir and nearby areas (Minor and Beckham, 1991). Twelve historic structures were recorded within the reservoir pool area, including houses, barns, and other outbuildings dating from the early 20th century.

In 1991, test excavations were conducted in a small area that will be affected by a road realignment. Two previously unrecorded prehistoric archaeological sites were discovered there. At least one of those sites appears to be eligible for inclusion in the National Register of Historic Places (Register).

Since completion of the Class III inventory, additional areas of potential project effect have been identified. Unsurveyed areas include the Otten Quarry and the microwave tower location and access road. A Class III cultural resource inventory will be needed of these and any other unsurveyed areas of potential project effect. Also, consultation with Native American tribes must be completed for all areas that could be affected by project development to determine if resources or locations of traditional value to the tribe are present.

3.1.18.2 Impacts to Cultural Resources

It is not possible to assess potential project effects on archeological resources until test excavations have been completed to determine if the recorded sites are eligible for inclusion in the Register. Also, test excavations are required in landforms that have a high potential to contain unrecorded archeological sites, or where historic records indicate a homestead might be present.

Sites with significant deposits are eligible for inclusion in the Register. Inundation of a site would have an adverse effect upon its integrity. Saturation would cause accelerated decay of some kinds of archeological materials and contaminate carbon samples valuable for dating a site. Drawdown or currents within the pool could erode soils containing the archeological materials and destroy the depositional integrity.

Bureau of Reclamation determined that the historic structures within or near the reservoir pool area are not eligible for inclusion in the Register. The Oregon State Historic Preservation Officer (SHPO) must be consulted about significance of the structures. If all parties agree that the structures are not eligible for inclusion in the Register, then, under the law, their destruction would not constitute an effect upon a cultural resource. If a structure should be found eligible for listing, then its alteration or destruction would be an adverse project effect, and mitigation might be required.

Sites of traditional value to Native Americans could be adversely affected, through destruction, restriction of access, or introduction of incompatible features or activities nearby. Actions to avoid, reduce, or mitigate these effects would be required.

3.1.18.3 Mitigation of Impacts to Cultural Resources

If test excavations indicate any archeological site is eligible for the Register, then means to avoid or reduce the adverse project effect will be investigated. Where adverse effects cannot be avoided, the adverse effect will be mitigated through data recovery. A site protection and mitigation plan would be developed and presented to the SHPO and the Advisory Council on Historic Preservation (Council) for review and approval. A Memorandum of Agreement (MOA) for impact mitigation actions would be signed by Reclamation, Douglas County, the SHPO, and the Council. Native American tribes would be consulted regarding treatment of human remains and other objects, consistent with requirements in the Native American Graves Protection and Repatriation Act of 1990.

If a standing structure was determined eligible for inclusion in the Register, means to preserve the structure would be sought. If preservation was not feasible, its historic and/or architectural characteristics would be documented. These actions would also be addressed in the site protection and mitigation plan and the MOA described above.

If sites or resources of traditional value to Native Americans were in the project area, Reclamation or Douglas County would consult with the appropriate tribe to determine means to avoid or reduce the effect to an acceptable level. If these measures would not be sufficient, then means to mitigate the effect would be sought, in consultation with the tribe, SHPO, and Council.

Prior to beginning the project, Reclamation would assure that Douglas County completes test excavations to determine site significance, as well as consultations with the SHPO, Council, and appropriate tribes in accordance with Section 106 of the National Historic Preservation Act of 1966 pursuant to the Council's regulations, "Protection of Historic Properties" (36 CFR Part 800). Reclamation would assure that Douglas County completes any actions required as a result of consultations prior to any ground disturbance at areas that may contain sites.

3.1.19 Visual Resources

3.1.19.1 Existing Visual Resources

The general character of the reservoir pool area is that of a rural agricultural setting. There is a mixture of fenced pasture land, woodlands, shrublands, and forested slopes. The dam site is located in an area recently logged, which cannot be seen from either County Road #7 or County Road #8.

The winding nature of Elk Creek and narrowing of the canyon on either end of the proposed reservoir pool area serves to break visibility up and down the creek. Much of the valley has been greatly altered by private land owners. On most properties, portions of the natural vegetation on flat, low-lying lands have been replaced with introduced grass species. Three high voltage power lines traverse the upper portion of the reservoir pool area which detracts from the local rural, agricultural setting.

The overall viewer sensitivity could be rated as low because of the viewer. Most of the viewers are local residents, many of whom regard the Elk Creek area as scenic because of its relatively isolated rural, pastoral setting.

Seasonal flow conditions downstream of the proposed damsite present less than satisfying visual reactions. High flows during winter and spring result in bank overflows and minor flooding. Low summer and fall flows result in dry or nearly dry creek beds, especially in the area from Drain to Elkton. These seasonal flow conditions detract from the otherwise high visual quality presented by Elk Creek. Many pools in lower Elk Creek become stagnant during low flows, resulting in accelerated algae growth and unpleasant smells.

The Bureau of Land Management has classified the lands that it administers in and near the proposed reservoir (See: Figures 3-19-1, 3-19-2) as Visual Resource Management (VRM) Class IV (BLM Manual

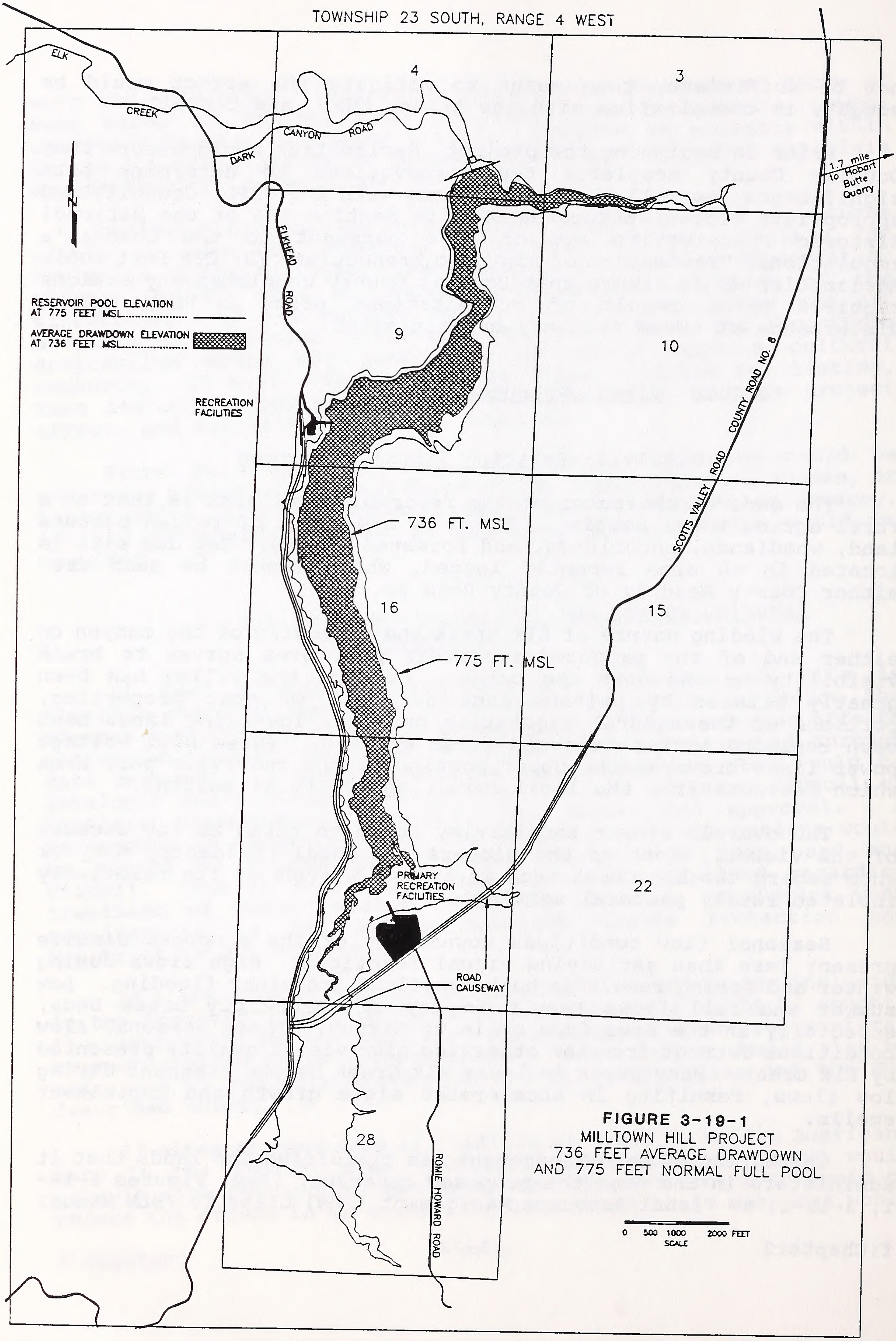

FIGURE 3-19-1
MILLTOWN HILL PROJECT
736 FEET AVERAGE DRAWDOWN
AND 775 FEET NORMAL FULL POOL

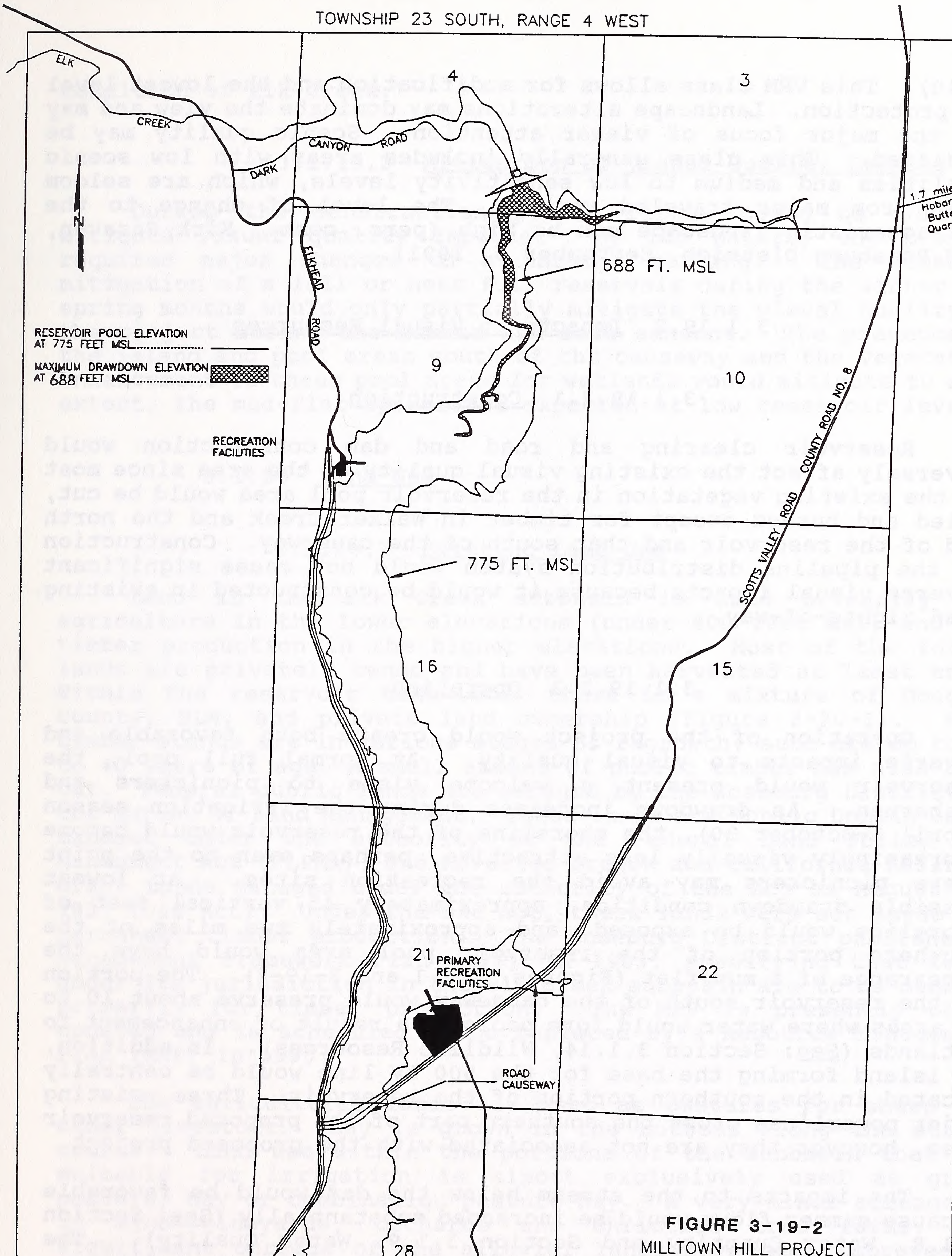

FIGURE 3-19-2
MILLTOWN HILL PROJECT
690 FEET MAXIMUM DRAWDOWN
AND 775 FEET NORMAL FULL POOL

8440). This VRM class allows for modification and the lowest level of protection. Landscape alterations may dominate the view and may be the major focus of viewer attention. Scenic quality may be modified. This class generally includes areas with low scenic qualities and medium to low sensitivity levels, which are seldom seen from major traveled routes. The level of change to the characteristic landscape can be high (pers. comm., Kirk Casavan, BLM Roseburg District, September 6, 1991).

3.1.19.2 Impacts to Visual Resources

3.1.19.2.1 Construction

Reservoir clearing and road and dam construction would adversely affect the existing visual quality of the area since most of the existing vegetation in the reservoir pool area would be cut, piled and burned except for timber in Walker Creek and the north end of the reservoir and that south of the causeway. Construction of the pipeline distribution system would not cause significant adverse visual impacts because it would be constructed in existing road rights-of-way.

3.1.19.2.2 Operation

Operation of the project would create both favorable and adverse impacts to visual quality. At normal full pool, the reservoir would present a welcome vista to picnickers and fishermen. As drawdown increases during the irrigation season (April 1-October 30), the shoreline of the reservoir would become increasingly visually less attractive, perhaps even to the point where picnickers may avoid the recreation sites. At lowest possible drawdown condition, approximately 45 vertical feet of shoreline would be exposed, and approximately two miles of the southern portion of the reservoir pool area would have the appearance of a mud flat (Figures 3-19-1 and 3-19-2). The portion of the reservoir south of the causeway would preserve about 10 to 15 areas where water would form pools as a result of enhancement to wetlands (See: Section 3.1.14, Wildlife Resources). In addition, an island forming the base for the 500 KV line would be centrally located in the southern portion of the reservoir. Three existing major powerlines cross the southern part of the proposed reservoir area, however they are not associated with the proposed project.

The impacts to the stream below the dam would be favorable because summer flows would be increased substantially (See: Section 3.1.8, Water Quantity and Section 3.1.9, Water Quality). The increase would be visually more acceptable than present conditions. With project-controlled flows, the magnitude of winter and spring floods would be decreased, creating a more acceptable visual condition of Elk Creek.

3.1.19.3 Mitigation of Visual Quality Impacts

During the construction period little could be done to mitigate visual quality impacts. By its nature, the project requires major changes to a natural setting. The seasonal mitigation of a full or near full reservoir during the winter and spring months would only partially mitigate the visual quality of the project during the summer and fall seasons. The presence of the island and pool areas south of the causeway and the vegetative enhancement of these pool areas for wetlands would mitigate to some extent, the mud-flat appearance expected at low reservoir levels.

3.1.20 Land Use

3.1.20.1 Existing Land Use

Land in the Elk Creek subbasin is used primarily for agriculture in the lower elevations (under 800 feet msl) and for timber production in the higher elevations. Most of the forest lands are privately owned and have been harvested at least once. Within the reservoir take-line, there is a mixture of Douglas County, BLM, and private land ownership (Figure 3-20-1). Most timber stands are in various stages of regrowth; some are up to 25 to 40 years of age. A small amount of public timber has also been cut. Federal public lands are managed by the Roseburg District of the Bureau of Land Management. These lands are Public Domain lands managed under the authority of the Federal Land Policy and Managment Act (FLPMA), and Revested Oregon and California Railroad Grant Lands managed under the authority of the Act of August 28, 1937 (O&C Act). Under the O&C Act, these lands were set aside for permanent timber production. The Roseburg District published a Management Framework Plan (MFP) in 1983, specifying that lands under its jurisdiction in the Elk Creek subbasin are to be managed primarily for timber production. The MFP is presently being updated and is scheduled to be replaced by a Resource Management Plan (RMP) in 1993.

The agricultural lands are used as pastures for sheep and other livestock. Hay is grown in the bottoms along the stream course. Land use within the portions of the subbasin that are suitable for irrigation is almost exclusively used as grass pasture, hay or combination pasture-hay. A very minor acreage is in wine vineyards, orchards and Christmas tree farms. A significant acreage of the alluvial lands have been improved by clearing of timber and undergrowth, leveled and subsequently seeded to grass-clover mixes such as perennial ryegrass and white clover. The residual soils on the outlying slopes have generally unimproved

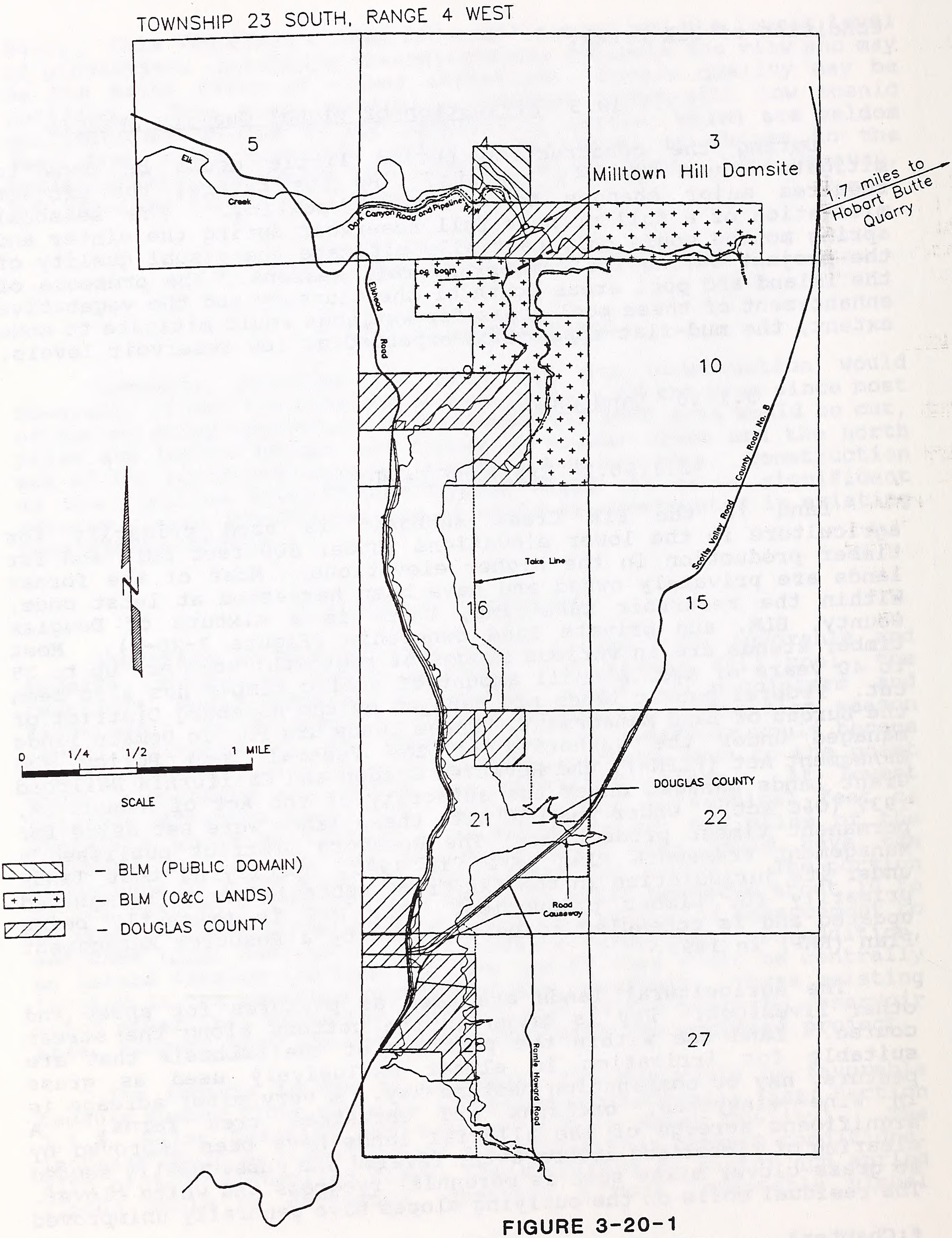

FIGURE 3-20-1
MILLTOWN HILL PROJECT
LAND OWNERSHIP

native range grasses with scattered brush and timber. There are no Prime or Unique farmlands in the irrigation service area according to the SCS. The reservoir area was surveyed for Prime and Unique farmlands in 1991. A total of 115 acres were classified as having soils qualified as Prime farmlands (Figure 3-3-4).

A minor portion of the Elk Creek subbasin is occupied by the towns of Drain, Elkton, and Yoncalla. Another small portion is occupied by Interstate 5 and other minor State and County roads, and a railroad right-of-way. An electrical utility corridor transects the project area in the vicinity of the proposed reservoir.

3.1.20.2 Impacts to Land Use

3.1.20.2.1 Construction

Construction of the Milltown Hill project would immediately change land uses on 680 acres in the reservoir site and the adjacent 512 acre "take" area. There would be a change of use from present farming and timber production to a water storage facility, with the dam and ancillary recreational facilities. Portions of County Roads #7 and #8 would be relocated. At least 10 residences with outbuildings would be moved or destroyed. The installation of the pipeline system would not adversely affect existing land use.

3.1.20.2.2 Operation

The operation of the proposed project would cause no significant immediate change in land use in the service areas of Yoncalla and Scotts Valleys, or in the arable lands below Drain. As the irrigation systems are developed adjacent to Elk Creek and in Yoncalla and Scotts Valleys, there would be an increase in irrigated pasture land. Some land-use diversification may result, with lands being devoted to grass seed production as well as pasture land.

Some lands in or near Drain and Yoncalla may be developed into new industrial sites, since more water would be available for industrial use. Lands adjacent to the reservoir would be subject to new outdoor recreational use. BLM lands inundated by the reservoir would be lost from the agency's timber production base. The project's intent to provide recreational use could result in changes in the BLM management plan for its lands near or in the reservoir from solely timber production to modified timber production, with possible timber harvesting restrictions and curtailments. This would probably increase recreational use and provide for acceptable visual quality of the lands under its jurisdiction.

3.1.20.3 Mitigation of Land Use Impacts

The overall adverse impacts of land use changes in the irrigation service areas are considered insignificant. They would be offset by the economic and social benefits in the irrigation service areas along Elk Creek and in Yoncalla Valley and Scotts Valley. New opportunities in water-based sports and recreation on the reservoir also would help offset impacts.

3.1.21 Socio-Economic Conditions

3.1.21.1 Existing Conditions

3.1.21.1.1 Population Characteristics

Economic dependence on the unpredictable wood products industry is demonstrated in the inconsistent recent population trends in Douglas County. Population more than doubled between 1940 and 1950 as shown in Figure 3-21-1. Compared to a 4.8 percent growth rate in the 1960's, Douglas County's population gained 30.7 percent from 1970 to 1980. Between 1980 and 1983, population decreased by 3,350 persons to a population of 90,400. Steady growth since 1984 has resulted in an estimated population of 95,000 The racial composition of the County is largely white with 97.5 percent. Native Americans accounted for 1.2 percent, while Asian and Pacific Islanders accounted for 0.5 percent, Blacks 0.1 percent, and other 0.7 percent. The Hispanic group, which is an ethnic category, was the largest minority group with 1.9 percent of the population. Population data was provided by the U.S. Census Bureau for the years 1900 through 1980. The Douglas County Planning Department provided population data for 1983 through 1989 (Bureau of Reclamation, 1991).

The latest available subcounty population estimates were developed by the Center for Population Research and Census of Portland State University for 1988 and are shown in Table 3-21-1.

Table 3-21-1. Population Estimates 1987-1988.

City	1980	July 1987	July 1988
Drain	1,295	1,085	1,070
Yoncalla	908	800	790
Elkton	175	165	175
Total	2,375	2,050	2,035

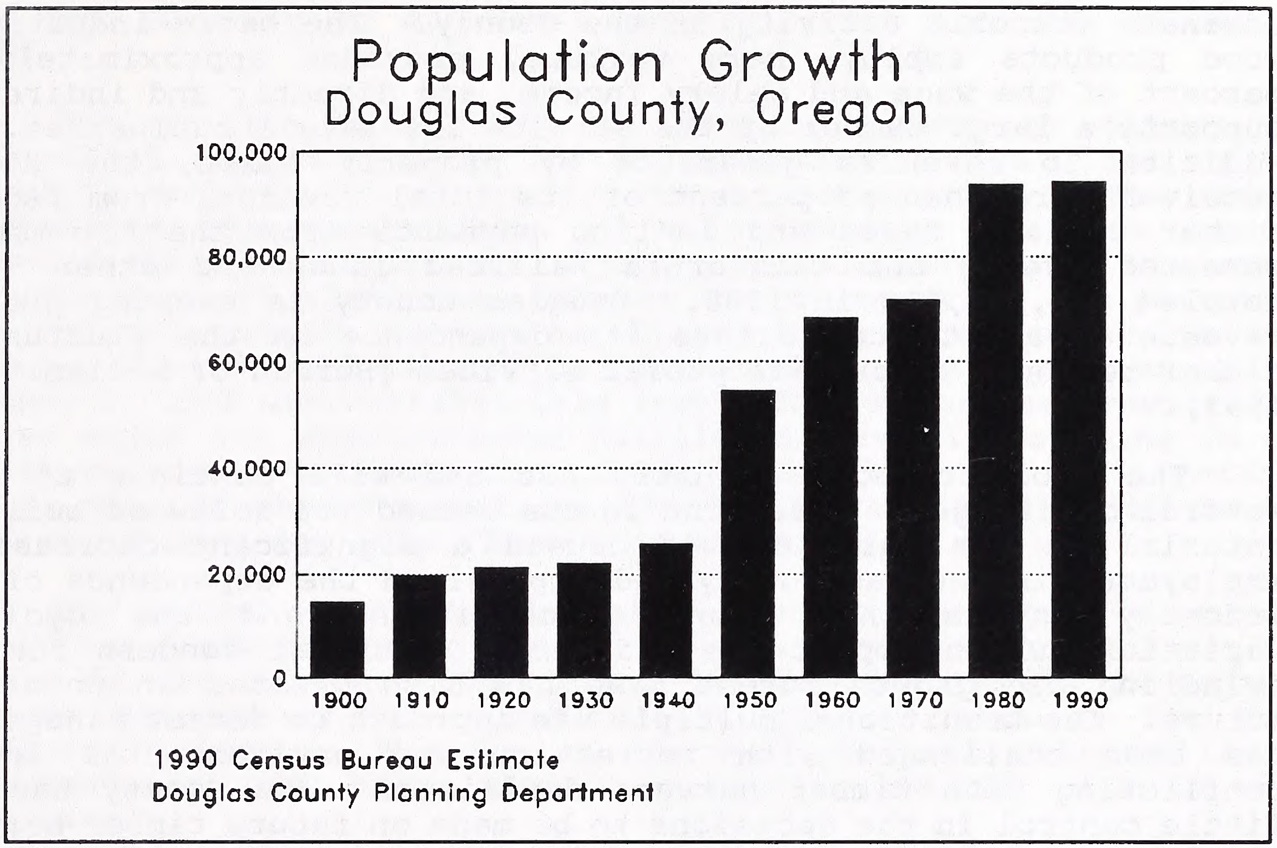

Figure 3-21-1. Population growth.

As noted in Table 3-21-2, Douglas County follows the trend of Oregon and the United States with a larger proportion of population in the 25- to 55-year age group containing the "baby-boomer" generation. Older residents have also increased as a percentage of the total population (Bureau of Reclamation, 1991).

Table 3-21-2. Distribution of Population by Age (percent).

Age Group	Douglas County	State of Oregon 1980	State of Oregon 1989
Under 25 years	37.2	41.4	37.0
25 - 55 years	41.2	37.9	39.3
Over 55 years	21.6	20.7	23.7

3.1.21.1.2 Industry

Douglas County contains a larger timber supply than any other Oregon County, this timber supply is the basis of economic activity in the County. Timber harvest and the manufacture of wood products dominate economic activity in the County. The basic industry of wood products employs more workers, provides approximately 40 percent of the wage and salary income, and directly and indirectly supports a large number of the service and retail businesses. In addition to revenues generated by property taxes, the County receives more than 50 percent of its total revenues from federal timber sales. Taxes and in-lieu payments from the harvest on revested Oregon and California Railroad lands and other lands totaled $41,522,000 in 1988. Douglas County is seeking greater revenue diversity to relieve its dependence on the fluctuating timber revenues to provide public services (Bureau of Reclamation, 1991).

The wood products industry has and will continue to face several challenges. A decline in the demand for softwood building material in the early 1980's caused a significant decrease in employment in Douglas County and emphasized the dependence of the industry on national economic conditions and the cyclical variations which impact the industry. National concern for the dwindling old growth forest base has also created an uncertain future. The traditional multiple use approach to forest management has been challenged with recreation and environmental issues conflicting with timber harvest decisions. The County has had little control in the decisions to be made on future timber harvest levels on federal, state, and private lands, (Bureau of Reclamation, 1991).

The second basic industry, tourism, also relies on the natural resources of the County. Several destination recreation areas in the County, including Crater Lake National Park and the Oregon Sand Dunes National Recreation Area, three wilderness areas, the Umpqua national forest as well as the County's extensive park system, attract visitors. Interstate-5 passes through the County from north to south. Good roads leading to the ocean and the mountains provide recreation opportunities for sightseers, fishermen and hunters (Bureau of Reclamation, 1991).

Agriculture is another basic industry that plays an important role in the economy of Douglas County. Livestock grazing occurs on 11 percent of the County's land area. Orchards, grains, and row crops are grown on another 2 percent. Douglas County is the leading sheep producer in Oregon, as well as a leading cattle producer in western Oregon. Livestock, hay, and pasture remain the most important agricultural products, particularly in the Elk Creek subbasin. Lack of a reliable source of water for irrigation is limiting the expansion of this industry (Bureau of Reclamation, 1991).

Douglas County contains abundant mineral deposits and is the only domestic source of nickel, however low market prices have discouraged mineral extraction. The last mining operation in the Elk Creek subbasin was the Elkhead Mine which extracted cinnabar for the recovery of elemental mercury. The mine was closed in 1971.

Efforts are being made by Douglas County to change the industrial composition of its economic base. The first is the County's efforts to diversify the economic base. The County identified the construction of water storage projects as one element in the effort to attract new industry to the area. Construction of additional storage would improvide the potential for economic growth, because existing industries are water limited. The construction of Galesville Dam in the southern portion of the County in 1985 demonstrates this fact. This effort has resulted in three major new manufacturing facilities recently locating in the Roseburg area. Although the wood products industry will continue to be Douglas County's most important industry, it will not be the source of many new jobs (Bureau of Reclamation, 1991).

The second effort is the broad restructuring of the economy away from goods-producing towards service-producing, reflecting the trend in the Nation. The impact is less noticeable in Douglas County because of the substantially greater role of the wood products industry. However, as the wood products industry itself restructures, the trend towards a service economy will be more noticeable.

3.1.21.1.3 Employment

The total civilian labor force in Douglas County totaled an average 45,000 people in 1990. Approximately 7.6 percent of the work force or 3,400 people were unemployed. Total non-agricultural wage and salary employment in Douglas County averaged 32,000 in 1989 according to data provided by the Employment Division of the Department of Human Resources of the State of Oregon. Approximately 8,900 of these jobs were in the timber and wood products industry with a 1989 payroll of over $217 million. These jobs are included in the percentage of manufacturing jobs illustrated in Figure 3-21-2. It is estimated that each wood products industry job creates at least one other job in the business community. Self employed and unpaid family workers comprise 11 to 13 percent of the total work force. Nonfarm proprietors increased at a rate of 24.7 percent in 1987 outpacing total employment growth of 11.3 percent. Federal, State, and local governments employ approximately 10,000 persons (Bureau of Reclamation, 1991).

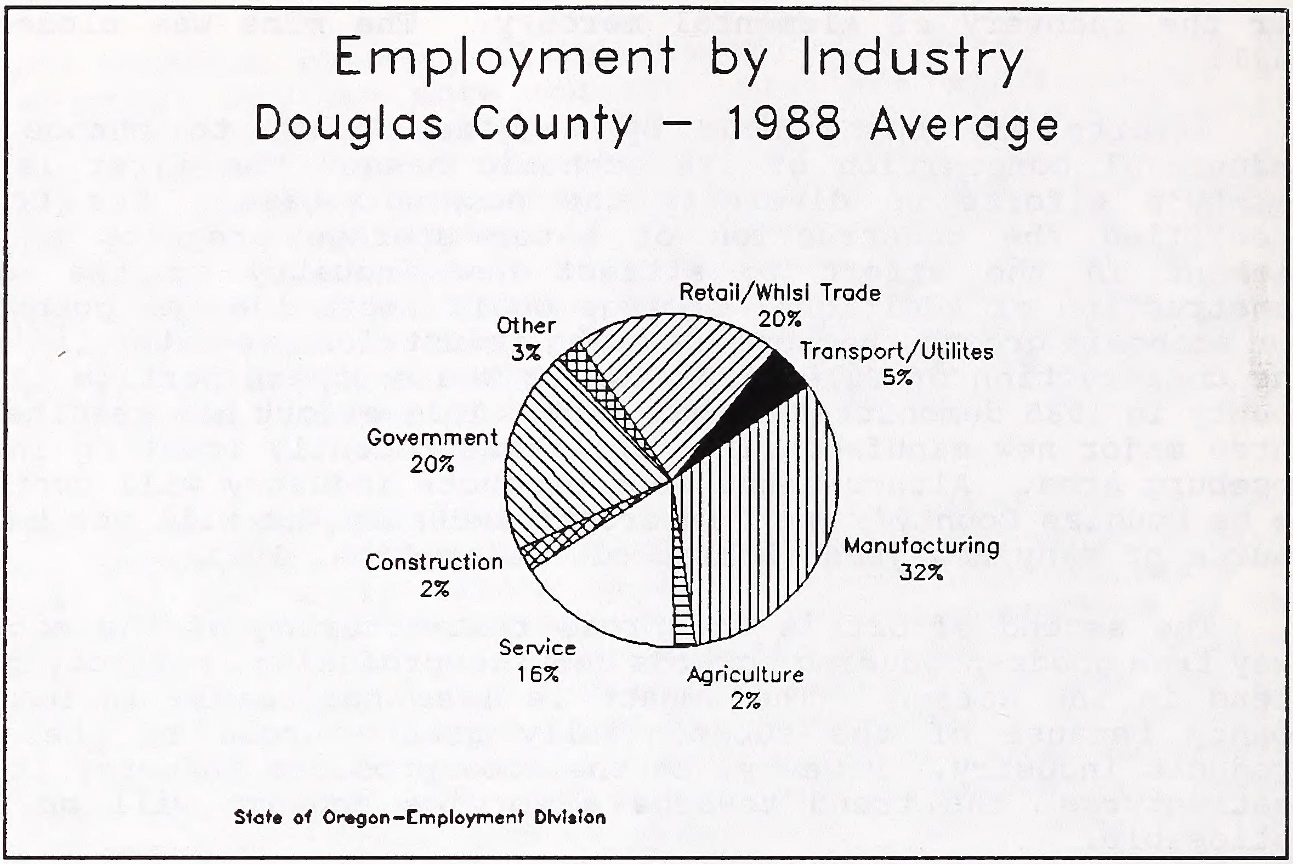

Figure 3-21-2. Employment by industry.

Employment in the agricultural sector has eroded with an average 930 workers in 1988 compared to 1,210 seasonal and nonseasonal workers in 1980. The County's total labor force has a history of steady growth similar to the trend of the Nation. Cyclical and seasonal variations in the wood products industry are significant factors in unemployment.

3.1.21.1.4 Income

In 1989, approximately 65 percent of personal income in Douglas County is received in the form of wages and salary. Dividends, interest, and rent account for 16 percent, and transfer payments are about 19 percent. This is contrasted to 1970 when transfer payments totaled 12 percent and dividends, interest, and rent were 12 percent. The largest single source of transfer payments in Douglas County is payment for retirement and disability. Thirty-eight percent of earned income (wages and salaries) comes from manufacturing industries as shown in Figure 3-21-3. Manufacturing employs 32 percent of the work force (Bureau of Reclamation, 1991).

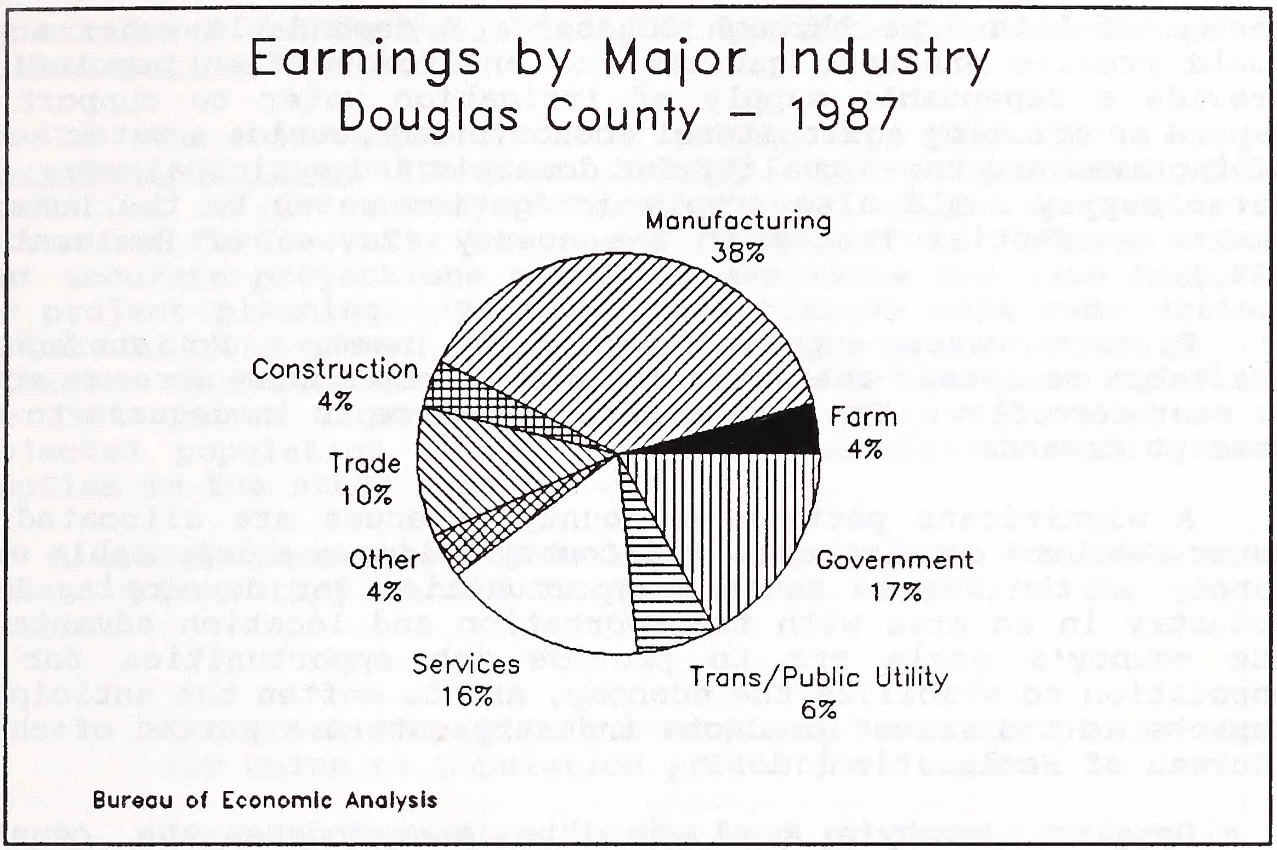

Figure 3-21-3. Earning by major industry.

Households in Douglas County average 2.67 persons as compared to 2.52 persons per household for the State. Approximately 18.3 percent of households in Douglas County are single person households as compared to a single household population of 23.5 percent at the State level. In 1979, the most recent year for which figures are available, 8.6 percent of families were below the poverty level in Douglas County. This compares to 7.7 percent of families statewide that were considered to be below the poverty level that year. More recent data on poverty are available only at the national level. At that level, the number of Americans living below the poverty standard increased by 35 percent through 1983. The national poverty rate at the time of the 1980 census was 11.7 percent, slightly higher than Oregon's 10.7 percent. It would be expected Oregon and Douglas County would follow the general trend of the national statistics (Bureau of Reclamation, 1991).

3.1.21.1.5 Water Supplies and Demands

In the early 1980's, Douglas County prepared a comprehensive planning document to comply with a State of Oregon planning effort. As a part of this effort, the County identified a need for a dependable water supply in the Elk Creek subbasin during the dry months of late June through October. A dependable water supply would provide enhanced habitat for anadromous fish populations, provide a dependable supply of irrigation water to support and expand an existing agricultural economy, and provide a water supply of improved and known quality for domestic and municipal use. This water supply could also supply irrigation water to the numerous small residential tracts in the county (Bureau of Reclamation, 1991).

Present water supplies are fully used. No storage is available to retain the water for use at times when streams are at or near zero flow. The ground-water resource is inadequate to meet present demands.

A significant portion of county revenues are allocated for water resource development. The County believes a dependable water supply is the key to enhance opportunities for developing light industry in an area with transportation and location advantages. The county's goals are to provide job opportunities for its population to stabilize the economy, and to soften the anticipated impacts as the forest products industry enters a period of change (Bureau of Reclamation, 1991).

Douglas County's goal is "to accommodate the county's anticipated growth while promoting wise land use and conservation of natural resources." Local communities have shown diligence in complying with the spirit of this goal in providing potable water supplies. The cities of Drain and Yoncalla have been particularly aggressive, given their rural nature and relatively small population. Both communities serve water through metered lines which provide greater conservation control. Drain and Yoncalla have tried to augment their water supplies by constructing small storage reservoirs to help meet municipal demands during the dry summer months. Drain owns a small reservoir on Billy Creek with a capacity of 290 acre-feet. Yoncalla has an offstream storage facility with a capacity of 100 acre-feet which it fills by pumping water from Adams Creek. The reservoir helps meet peak summer demands when the flow in Adams Creek cannot meet demand. The subbasin has no other significant storage facilities (Bureau of Reclamation, 1991).

Estimates of projected municipal and rural domestic water use are tied to population projections. Federal planning for water resource projects normally relies on the population projections made by the Bureau of Economic Analysis (BEA). These projections are commonly referred to as "OBERS" projections. OBERS are based on Bureau of Census projections for the Nation. A "step-down" process is used to allocate population to individual states and substrate areas such as BEA economic areas, standard metropolitan statistical areas (SMSA), and some larger water resource areas. County level data is not available from OBERS. The step-down process of OBERS data to the level of Elk Creek subbasin would be too extensive and the reliability of the data questionable (Bureau of Reclamation, 1991).

In the development and subsequent updating of the Comprehensive Plan (Douglas County, 1989), estimated future population in the county determined per capita use rates and determined future water use needs (Myers, 1989). These are the most accurate projections currently available and have been used for project planning. Because the estimates were made during a period of strong growth, the projections may be somewhat high. The estimates of demand are scheduled for review by Tucson Myers when the 1990 census figures are released. Table 3-21-3 shows the projected population growth for the communities needing water supplies in the study area.

Although these projections represent the best available at the present time, they should be considered carefully for several reasons:

- Elk Creek subbasin is a very small subunit of the county for which no population projections exist.
- Because of problems in the wood products industry in the early 1980's, Douglas County lost an estimated 1,000 people from 1980 to 1985, which counters earlier growth projections. No one knows how much of this loss occurred in the Elk Creek subbasin.
- While population growth has returned to the county in the last 4 years, uncertainty over harvesting levels of old growth timber again threatens the wood products industry and population in the county and Elk Creek subbasin.

Table 3-21-3. Population Projections, Incorporated Cities.

Subarea	1980	1990	2000	2010	2020	2030
Elkton	175	235	295	355	415	475
Drain	1,295	1,740	2,184	2,629	3,073	3,518
Yoncalla	908	1,220	1,532	1,843	2,155	2,467
Total	2,378	3,195	4,011	4,827	5,643	6,460

NOTE: 1980 populations taken from the 1980 Census. 2030 populations calculated by Myers (1991) using the growth rates for north Douglas County taken from the Douglas County Comprehensive Plan. All other populations calculated using an average 34.3 percent increase per decade.

Unlike the county, Elk Creek subbasin never fully recovered from the recession of the 1980's. Population estimates for 1987 and 1988, made by the Portland State University Center for

Population Research and Census, indicate that the urban areas of the subbasin have lost over 14 percent of their 1980 population. At the same time, there are signs of growth in the Rice Hill area (a few miles south of Yoncalla). A large, successful truck stop has provided the impetus for other service related industries (Bureau of Reclamation, 1991).

Because of the many uncertainties, it is deemed advisable to use the extended projections presented above for water resource planning within the subbasin. This would assure adequate planning for a range of growth opportunities. These projections of urban population are displayed in Figure 3-21-1.

Although many studies indicate that water consumption is increasing nationwide, for projections in this study the per capita consumption rate for 1980-1986 is held constant to reflect increasing use of conservation measures.

Per capita rates were calculated by averaging the actual raw water diversions of the incorporated communities over the period of 1980-1986. (Using local data automatically factors in variables such as climate and economic conditions that can affect the per capita use.) The 1980 census population was divided into the averaged diversion to determine a per capita use. Rural environments tend to show higher per capita rates than urban environments because of small plot irrigation and stock watering activities. The incorporated communities in the Elk Creek subbasin are referred to as urban but still exhibit many rural characteristics. In addition, commercial timber activities at Drain use treated municipal water in processing and manufacturing wood products which shows up as a disproportionately high level of per capita use. Both Drain and Yoncalla deliver water through metered systems (Bureau of Reclamation, 1991).

For the city of Drain, the per capita rate is 361 gallons per capita per day (GPCPD). Peaking per capita use is 650 GPCPD. For the city of Yoncalla, the per capita rate is 214 GPCPD, and the current peaking rate is estimated at 385 GPCPD. The rates for Yoncalla are lower than Drain's mainly because of Drain's industrial use.

Only two cities in the subbasin have surface water rights. The city of Drain has a 1909 priority right for 2 ft^3/s from Bear Creek (a tributary to Billy Creek) and a 1912 priority right for an additional 2 ft^3/s from Bear Creek. It also has a 1971 storage right for 1,000 acre-feet on Billy Creek. To date, the city has developed a reservoir with a capacity of 290 acre-feet on Bear Creek. These rights are adequate to meet present and future needs if they can be realized. The flows on Bear Creek are not adequate to allow the existing reservoir to meet future demands (Bureau of Reclamation, 1991).

Yoncalla has a 1923 priority right for 1.5 ft^3/s from West Fork Wilson Creek, Wilson Creek and Adams Creek and a 1940 priority right for 0.23 ft^3/s from Adams Creek. In addition, it has a 1979 storage right for 111.5 acre-feet. Yoncalla's reservoir is an offstream location in the Yoncalla Valley which it fills by pumping water from Adams Creek. Again, the rights appear to be adequate, but the opportunity to develop them is limited. Adams Creek has recorded zero flows at times. Given these conditions, the city's supply may not be reliable. Further, Yoncalla's reservoir is shallow and suffers from algae growth and high temperatures which adversely affects the water's palatability (Bureau of Reclamation, 1991).

Elk Creek's peak runoff occurs between November and April. July and August are particularly dry; precipitation during these two months is less than 1 percent of the annual average, and the resultant runoff is particularly low, often approaching or reaching 0 ft^3/s. The peak municipal demand occurs at the same time as the low flows. The opportunity to actually develop and use municipal water rights is limited by natural surface water conditions. Future growth will continue to strain the ability of towns to provide reliable service. This fact has not gone unnoticed. Both Douglas County and communities in the Elk Creek subbasin have reported being "passed by" by potential industries because of the water supply problem (Bureau of Reclamation, 1991).

The municipal need for the subbasin amounts to additional storage capacity to enable the communities to meet demands during low flow periods with adequate carryover for short-term drought conditions.

Based on population projections, the cities of Drain and Yoncalla will need an additional 1,405 acre-feet of water or 51 percent of the total projected demand shown in Table 3-21-4 to meet needs through the year 2030.

Table 3-21-4. Municipal Diversion Demand (acre-feet).

Town	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
1980													
Drain	38	38	41	43	36	42	38	44	47	56	51	40	514
Yoncalla	17	16	16	16	15	14	15	15	17	26	26	22	215
Total	55	54	57	59	51	56	53	59	64	82	77	62	729
2030													
Drain	149	147	158	167	141	162	147	171	184	217	199	156	1,998
Yoncalla	58	54	56	54	50	47	52	52	58	88	90	75	734
Total	207	201	214	221	191	209	199	223	242	305	289	231	2,732

Source: Bureau of Reclamation, 1991.

The unincorporated area of Rice Hill is rapidly growing and may need to participate in the municipal supply. A recent gasoline spill from an underground storage tank contaminated existing ground-water supplies. The State Department of Environmental Quality reports that there is only a small amount of contaminates left which do not now pose a significant hazard to ground-water supplies or to surface water. However, the very limited availability of ground water and the Rice Hill spill points out the vulnerability of this source of water. It is likely that access to a municipal supply will become a necessity as rural development expands (Bureau of Reclamation, 1991).

The county uses the term "rural domestic" to denote the water needs of people who obtain water from individual sources and are not served by any water vending entity. Most often, these people obtain ground water from private wells. Occasionally, a larger well or series of wells may be drilled to benefit a group of residents. Generally, surface water sources are not diverted because of the cost of potable treatment. The rural growth in Elk Creek subbasin has recently outpaced the growth in cities. This points toward a trend in which a central water supply may be more beneficial. Figure 3-21-2 shows population projections as extended to the year 2030. From a 1980 population of 4,050 the area is expected to reach 5,735 by 2030 (Bureau of Reclamation, 1991).

The lack of available measured diversions for rural areas makes estimating per capita use more difficult. The rates adopted by the county were developed by Pacific Northwest River Basins Commission (Bureau of Reclamation, 1991). General rates ranging from 205 to 230 gallons per capita per day (GPCPD) were selected for Douglas County. These in turn were further adjusted by a factor of 1.4 to allow for peak monthly needs during July and August. Further consideration was given to the fact that within Elk Creek subbasin, such supplies would have to come from storage water. Repayment of the cost of a storage facility would be reflected in charges to water users. This charge is anticipated to slightly curb water use since not all rural users avail themselves to additional irrigated water, but rather continue their present water use practice. The county has assumed a 10 percent reduction. The effect of these adjustments is a per capita rate of 270 GPCPD for the domestic use and includes lawn and garden irrigation. Using county data, the annual rural demand in 1980 is calculated at about 822 acre-feet. By 2030 the demand is projected to be 1,164 acre-feet. To provide a reliable source for this water, a storage facility would be required (Bureau of Reclamation, 1991). Table 3-21-5 shows the distribution of the rural diversion demand.

Table 3-21-5. Rural Diversion Demand (acre-feet).

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
1980	60.3	57.2	61.4	60.3	55.1	59.3	57.2	66.6	74.9	92.6	104.0	72.8	822.3
2030	85.4	98.4	86.9	85.4	70.5	84.0	78.4	94.3	102.6	131.1	147.3	99.8	1,164.2

Source: Bureau of Reclamation, 1991.

Industrial water use from Elk Creek is limited to two rights for log storage ponds, totaling 1.02 ft^3/s. This source has proven unreliable and the timber industry has had to use municipal water. Costs associated with the use of treated municipal water are prohibitive for most industrial applications. A new source of water is needed to provide industrial opportunities and diversification of the economy. Future industrial water use in the Elk Creek subbasin is expected to be limited to sand and gravel operations. This use would require about 25 acre-feet per month from May through October for a total of 150 acre-feet annually.

The hilly topography supports lush unirrigated pasture part of the year, which contributes to the predominance of sheep and livestock production. The county is the leading sheep producer in the State. However, little land is suitable for the production of crops that require annual tillage. Orchards and some specialty crops such as wine grapes have been produced in the past, but, distance to markets and processing costs are excessive for the volume produced. Local production volumes have not been adequate to attract processing facilities or marketing resources.

Agricultural areas in the subbasin receive approximately 40 inches of rain per year, but it is concentrated in the months of October through April. The area experiences very dry conditions July through September, resulting in low streamflows and restricting the water available to irrigate crops at critical growth periods. There is no irrigation storage to provide water during these dry summer months.

Natural precipitation is too low in summer to sustain crops. Irrigation is needed. Elk Creek is a rainfall runoff stream and its natural flow cannot meet summer irrigation needs. Water storage and an irrigation system is needed to optimize economic value of the arable land for food and fiber production.

The state of Oregon established minimum flow requirements on Elk Creek in 1974. Rights established after that time do not receive a full supply in most years. Further, commercial agriculture rights are not protected in times of drought or extreme low flow, and many pre-1974 rights are also turned off early in many years (Myers, 1991). Table 3-21-6 lists water rights by stream reach and specifies which rights precede 1974 and which ones came later.

Table 3-21-6. Elk Creek, Irrigated Acreage and Water Rights.

Stream reach	Irrigated acres	Pre-1974 acre-feet	Post-1974 acre-feet	Total acre-feet
Above Adams Creek	214.5	510.6	25.0	535.6
Adams Creek to Boswell Springs	437.0	1,070.0	22.5	1,092.5
Boswell Springs to Billy Creek	73.8	178.6	6.0	184.6
Billy Creek to Big Tom Folley Creek	604.2	1,461.0	49.5	1,510.5
Big Tom Folley Creek to Mouth	243.0	502.5	105.0	607.5
	1,572.5			3,930.7

Source: Myers, 1991.

The District 15 watermaster has indicated that water rights established before 1950 generally have a full supply of water each year. Priority rights established between 1950 and 1974 normally begin to be curtailed around the end of July in most years. Diversions with priorities after 1974 are normally cut off about July 1. Applying this schedule to existing irrigated acreage, between 350 and 680 acres receive a full supply; about 740 acres get water until July 31; and 73 acres receive water until June 30 in most years (Myers, 1991).

A special problem has hindered development of potentially irrigable land in the subbasin. Restricted subsurface water movement and inadequate natural drainage channels create a high water table and drainage problems. Without a stable water supply, there is little incentive for irrigators to invest in such land improvements (Bureau of Reclamation, 1991).

Previous soils and drainage studies by Bureau of Reclamation and others dated back to 1954 were reappraised as part of this study. The studies evaluated soils for economic potential for supporting commercial irrigated agriculture. Included in this reappraisal was a careful review of drainage problems caused by restricted subsurface water movement, natural drainage conditions, or a combination of both. These studies identified as many as 7,377 acres of potentially arable land (See: Table 3-21-7). This land could help the county achieve its goal to diversify and strengthen the county's economy.

The maximum legal water duty in Douglas County is 2.5 acre-feet per acre per year; this indicates that the subbasin needs 18,450 acre-feet per year to develop its total arable land base. Irrigating less than 7,377 acres of land or using less than 2.5 acre-feet of water per acre would reduce the annual water need for irrigation. Development of all 7,377 acres would also require significant development of drains to avoid high water table problems (Bureau of Reclamation).

Table 3-21-7. Summary of Potentially Arable Land to be served by the Milltown Hill Project.

Location	Total acres
Lower Elk Creek	1,731
Upper Elk Creek	885
Yoncalla Valley	3,301
Scotts Valley	1,460
Totals	7,377

Source: Bureau of Reclamation, 1991.

Junior water right holders on Elk Creek frequently lose their water supply in the latter part of the summer. These junior rights need a supplementary supply in order to fully utilize the land's potential. The uncertain water supply has prevented farmers from optimizing the productivity of their lands and has prevented the county from realizing the full economic potential of its land resources. Approximately 897 acres of land need supplemental water service. The average annual water needed to bring these lands to a full supply is 1 acre-foot per acre, or an average annual water need of 897 acre-feet (Bureau of Reclamation, 1991).

The proposed project would provide a full supply on 3,764 acres and a supplemental supply on 897 acres for a total of 4,661 acres of irrigated land (Myers, 1991; also, See: Section 3.1.12, Agriculture).

3.1.21.2 Impacts to Socio-economic Conditions

3.1.21.2.1 Construction Impacts

3.1.21.2.1.1 Construction Schedule

Douglas County proposes to complete construction of the Milltown Hill project within a 4-year period. The proposed construction schedule is shown in Section 2.2.2.15, Construction Schedule and Work Sequence.

3.1.21.2.1.2 Property Acquisition

The project would require acquisition of 10 parcels of land. Approximately 26 people including renters and owners would be relocated. Although some concern over price and the location of some access roads has been voiced, no organized opposition has been encountered. A fair market price would be paid by the County for these parcels. The County anticipates the cost of land acquisition will be $2,727,500. No significant impact to local housing is anticipated due to the small number of parcels involved. No retail services would be displaced.

3.1.21.2.1.3 Construction Labor Force and Salaries

The construction phase would produce income and employment impacts summarized in Table 3-21-8. The local economy would feel the influx of over $1.6 million in salaries in the first year, continuing to $3.8 million in the second year of construction and $3.9 in the third year and tapering down to $1.8 million in the fourth year. The total salaries are expected to be about $11 million over the four year construction period. Approximately 88 percent would be contractor construction worker salaries. This would result in a 4-year boost to the local service sectors.

Table 3-21-8. Estimated Salaries for On-site Labor and Number of On-site Jobs.

	year 1	year 2	year 3	year 4
On-site Government Employees	6	22	23	8
On-site Contractor Employees	38	102	103	42
Total Salaries	$ 1,606,000	$ 3,800,000	$ 3,928,000	$ 1,809.000

Source: Modified from Bureau of Reclamation, 1991.

Employment would follow the same pattern with 44 jobs in year 1. The peak would be in year 3 with 126 jobs, while in year 4 only 50 jobs would be available. With the current high unemployment rate in the county, particularly among individuals with construction skills, no significant influx of workers is anticipated. The county transportation system and other infrastructure is capable of handling commuting construction workers. There would be no noticeable shift in populations. During the construction period there would not be significant changes in income levels, demographic characteristics, or employment in the local area or in Douglas County. The short-term seasonal nature of the construction period would not result in population shifts or an influx of population to the local area.

A labor force is readily available. Outside the four Metropolitan Statistical Areas, Douglas County has the largest civilian Labor Force in Oregon, with the January, 1991 level being 44,320. The unemployment rate for the same period for the County was 12.7%, ranking third highest among Oregon counties; nearly double the statewide figure of 6.8% and the national value of 7%. Thus, Douglas County possesses all the primary resources necessary for further economic development and opportunities for diversification, except for a reliable water supply. With the project, that resource will become available (Myers, 1991).

3.1.21.2.2 Operation Impacts

3.1.21.2.2.1 Annual Benefits

The estimated annual benefits from operation of the project are approximately $2,598,321 as shown in Table 3-21-9. These estimates were derived during project evaluation for each project function (Myers, 1991).

Table 3-21-9. Annual Benefits from Project Operation.

Project Function	Annual Benefit
1. Irrigation	
Pipeline Service Area	$242,910
Elk Creek Service Area	83,000
Total	$325,910
2. Municipal/Industrial	
Pipeline Service Area	$942,490
Elk Creek Service Area	282,550
Total	$1,225,040
3. Anadromous Fish	
Commercial Fishery	$47,637
Sport Fishery	626,175
Total	$673,812
4. Recreation	236,100
5. Flood Control	137,459
TOTAL	$2,598,321

Source: Myers, 1991.

3.1.21.2.2.2 Increased Farm Income

The opportunity to supplement farm family income with sustained increases in livestock, hay and pasture production by additional irrigation would alleviate several problems facing the County. The steady and increased income would sustain and revitalize the retail and service industries, softening the seasonal, cyclical adverse impacts of timber industry employment. The new farm income would supplement income presently received from manufacturing or other timber dependent activities. Demand for social services would decrease, alleviating pressure on County budgets (Myers, 1991).

3.1.21.2.2.3 New Industries

A year-round water supply could also be used to strengthen non-timber related industries and attract new industries to the local area, especially Yoncalla, Rice Hill, and Drain. Yoncalla and Rice Hill also would benefit from increased availability of domestic water supplies since the pipeline would supply the Yoncalla and Rice Hill area. This would alleviate the problem of reliance on contaminated ground water at Rice Hill and the inadequate water supply at Yoncalla. Rural domestic water users would also experience a reliable water supply (Myers, 1991). The project's reliable water supply would enhance economic development and diversification in Douglas County and in particular within the project service area.

3.1.21.2.2.4 Commercial and Sports Anadromous Fisheries

The project would benefit the commercial and sports anadromous fisheries outside of the Elk Creek subbasin. Four anadromous fish species are involved: Winter steelhead, coho, fall chinook, and sea-run cutthroat. Benefits are based on the harvestable production and method of harvest (commercial or sport).

Table 3-21-10 shows an annual value for the ocean commercial harvest resulting from project enhancement efforts. Table 3-21-11 lists the benefit values for the sport fishery. Values derived represent annual benefits under full enhancement efforts.

Table 3-21-10. Annual Commercial Anadromous Fishery Value.

Species	Catch/ Escapement	Net Increase* in Escapement	Percent Commercial	Ocean Commercial Harvest	Average Dressed Weight (lbs)	Ex-Vessel Price	Benefit Value
Coho	4:1	1,450	66	3,828	5.1	$1.43/lb	$27,918
Fall Chinook	5:1	75	75	825	9.8	$2.44/lb	$19,727
Total				4,653			$47,645

* Losses upstream of the dam are considered in the computation of the net increase in escapement.

Source: Myers, 1991.

Table 3-21-11. Annual Sport Anadromous Fishery Value.

Species	Sport Harvest	Percent Ocean	Percent Fresh Water	Angler Days Ocean/Fresh	Ocean Benefit Value $60/day	Fresh Water Benefit Value $51/day	Total Sport Value
Winter Steelhead	2,900	0	100	0/2.9	--	$ 428,910	$ 428,910
Coho	1,974	85	15	10.8/3.3	$ 108,728	49,834	158,562
Fall Chinook	275	50	50	1.08/3.3	8,942	23,057	32,000
Sea-run Cutthroat	100	0	100	0/3.3	--	16,830	16,830
Total					$ 117,560	$ 518,715	$ 626,175

Source: Myers, 1991

The life cycle from smolts to adults would vary from one to three years depending upon species. Fisheries benefits, due to increased production and harvest resulting from project enhancement, could take several years to be fully realized. However, project enhancement benefits could be realized in a shorter time frame by planting smolts prior to completion of the project, thereby anticipating the return of harvestable stock the year the project is completed. Planting activity 3 years prior to project completion and 1 or 2 years after project completion could reduce the development lag by several years. This effort would also assure continued project enhancement and result in a major portion of the programmed annual benefits being realized in the first year of project operation. The majority of the harvest of one life cycle would occur during the second and third years after smolt release, depending on the species. The majority of fish populations for this project would consist primarily of winter steelhead and coho. The majority of the coho would have returned by the end of the second year of escapement. Most of the winter steelhead would return in the second year with a small portion returning in the third year following smolt release.

By implementing early planting of smolt, it is estimated that 60 percent of the annual benefits would be realized in year 1 of the project. The remaining 40 percent would be realized in years 3 and 4.

3.1.21.2.2.5 Reservoir Recreation Benefits

The physical constraints of the proposed reservoir site were evaluated to determine its suitability for development. Those physical constraints considered were reservoir access, shoreline slope and summer reservoir operation. Existing roads lead to the site and provide access to either side of the proposed reservoir.

The shoreline slope would provide areas suitable for development with some fill work and grading. Recreation facilities are proposed for two sites and will include access roads, caretaker facilities, launch ramps, trolley docks, individual and group picnic sites, car/trailer parking, restrooms, and hiking trails. Facilities would be handicap accessible. Additional facilities such as camping, additional picnic tables and hiking trails could be added if future demand develops. Boat ramps at the sites would accommodate all but the lowest reservoir levels.

The perceived quality of the recreation experience and the number of days of recreation use quantify the value of the benefits. The estimate of boat ramp recreation days counts only those fishing days which involve use of the boat ramp. The fishing days estimated are for non-boat ramp use fishing. This avoids the possibility of double counting benefits for fishing days. The reservoir recreation benefits are summarized in Table 3-21-12, and show an annual total benefit of about $236,000.

Table 3-21-12. Annual Reservoir Recreation Benefits.

Recreation Facilities	Number of Unit Days	Unit Day Value	Annual Benefit
Facility Based Use			
2 Boat Ramps1/	10,000	$4.42	$ 44,200
52 Picnic Units	20,000	$4.42	$ 88,400
Fishing Days	6,500	$4.70	$ 30,550
Subtotal	36,500		$163,150
Non-Facility Based Use 2\	16,500	$4.42	$ 72,930
Total	53,000		$236,080

1) Assumes east ramp would receive the majority of spring/early summer use, and west ramp would receive moderate spring/early summer and late summer use.

2) Sightseeing, hiking, wildlife observation, dispersed picnicking.

Source: Myers, 1991

It is anticipated that with average precipitation, the reservoir would reach capacity by the end of March of the first year. Thus, full use of the recreation facilities would be achieved in the first year after completion of the project.

3.1.21.2.2.6 Reduction of Flood Damage

Flood damage reduction benefits, provided by the Portland District office of the Army Corps of Engineers for the Cooperative Study, are the basis for the following material (Myers, 1991). The majority of flood damages occur within the city of Drain. In the absence of flood control measures, periodic flooding will continue. Damages were estimated for the 2, 10, 50, 100, and 500-year flood events. Damages were estimated for bridges, residential homes and contents, commercial buildings and contents, public buildings and contents, industrial buildings and contents, and agricultural lands. Douglas County provided information on agricultural lands, buildings, and replacement costs for bridges. Structural damage was based on information in the Willamette System Study. The annual flood reduction benefits for the Milltown Hill Dam project is estimated to be $136,000.

3.1.21.2.2.7 Reduction of Treated Effluent Costs

The Department of Environmental Quality regulates discharge of wastes in Oregon. That agency has required both Drain and Yoncalla to provide facilities for storage of treated effluent during the low-flow months of the year, when the quality and quantity of streamflows fall below levels that allow for adequate assimilation of treated effluent. Operation of the Milltown Hill Project would result in significantly augmented summer streamflows as releases are made from the reservoir to Elk and Yoncalla Creeks for downstream uses and to enhance aquatic habitat. The resultant improved instream quality and quantity conditions would provide an opportunity for alleviation of the storage requirements on the cities, thereby easing future needs for additional effluent storage capacity, increased treatment capabilities, or both. The economic benefit of this situation has not been evaluated.

3.1.21.2.3 Mitigation of Impacts to Socioeconomic Conditions

No significant influx of construction workers is anticipated because of the high unemployment in the County, particularly among individuals with construction skills. Presently unemployed workers would be available for project jobs. Similarly, no retail business would be displaced. The County transportation system and other infrastructure are anticipated to be capable of handling commuting construction workers with no noticeable shift in population among communities.

Mitigation of the people relocation impacts associated with the project would be done in accordance with the "Uniform Relocation Assistance and Real Property Acquisition Regulations for Federal and Federally Assisted Programs" (49 CFR Part 24). Notice of the Final Rule for these regulations was published in the Federal Register March 2, 1989. The purpose of this rule is to implement the "Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended (42 U.S.C. 4601 et seq.) with the objective that those affected by Federal and federally-assisted projects are treated fairly and consistently. A fair market price would be paid for all parcels of land acquired. In some instances, where lands are not to be inundated or required for some structural or recreation purpose, it may be possible to negotiate management easements, without displacing the land owner.

3.1.22 Transportation

3.1.22.1 Existing Transportation Conditions

Douglas County's transportation network serves the public well. Interstate-5 traverses the county from north to south. This highway is the main western link between Canada and Mexico. U.S. Highways 38 and 42 are the main east-west arterials. County Road #7 (Elkhead Road) provides 4 miles of paved 2-lane road from Interstate-5 to the west side of the proposed reservoir. County Road #8 (Scotts Valley Road) provides access to the east side of the proposed reservoir. County Roads #7 and 8 join at a point near the south end of the reservoir. State Highway 38 provides access from I-5 to Drain and Elkton. U.S. Highway 99W provides access from I-5 at Rice Hill to Yoncalla and Drain.

3.1.22.2 Impacts to Transportation

3.1.22.2.1 Construction Impacts

Most construction workers are expected to be local residents, commuting from Roseburg, 30 miles south of the project area. Most imported workers are expected to reside in Roseburg, Oakland, Yoncalla or Drain. Most construction activities would involve the clearing of the 680-acre reservoir and construction of the dam, so the majority of construction traffic would be on 4 miles of County road #7. Increased maintenance of this road would be required.

County Roads #7 and #8 would be partially relocated and/or upgraded (Figure 2-2). County Road #7, between the north end and south end of the reservoir (about 3 miles), would be relocated and upgraded less than 1/8 mile west of the existing road near 885 feet msl. County Road #8 would be relocated less than 1/8 mile from its present alignment and causeways added across Lane Creek and Elk Creek (Figure 2-2).

During construction, traffic would be allowed to use the existing roads with some minor delays, especially when the pipeline system is constructed at road crossings. The replaced segments of County Roads #7 and 8 would be abandoned after the new relocations were finished. Most of the construction traffic would occur in the reservoir pool area and at the Otten Quarry so no significant impact to transportation is anticipated during construction.

3.1.22.2.2 Operation Impacts

Changes to County Roads #7 and #8 would enhance the transportation system and increase safety along both routes. Traffic to the reservoir is anticipated to increase from the present 300 cars per day to at least 700 cars per day in the spring and summer recreation months.

3.1.22.3 Mitigation of Transportation Impacts

The County would perform road maintenance as required during the construction period to reduce delays in travel and for safety purposes. During operation of the project the County would increase maintenance on County Roads #7 and #8 during the spring and summer months when increased recreational use would occur. The increased safety factor due to the relocation of the roads would more than offset any delays or other adverse impacts during construction.

3.1.23 Police Protection

3.1.23.1 Existing Police Protection

Police protection is provided by the County Sheriff's Department. The Department's substation nearest to the area is located in Drain, approximately 8 miles away. In addition, the Oregon State Police has approximately 3 officers in Sutherlin (about 20 miles south) to assist the Sheriff's Department in law enforcement operations, including enforcement of traffic and game laws.

3.1.23.2 Impacts to Police Protection

The recreation sites at the reservoir would probably require a part-time Sheriff's deputy during the recreation season. Estimated annual cost is $20,000, which includes salary and vehicle use.

3.1.23.3 Mitigation of Police Protection Impacts

The County would absorb all costs of the extra police protection.

3.1.24 Fire Protection

3.1.24.1 Existing Fire Protection

Brush and timber fires are handled by the Douglas County Forest Protective Association, which has its headquarters in Roseburg. Structural fires would be responded to by the Yoncalla Volunteer Fire Department.

3.1.24.2 Impacts to Fire Protection

No significant fire protection impacts are expected as a result of construction and operation of the proposed project. However, the risk of forest fires would increase due to anticipated increased recreational use of lands in the vicinity of the reservoir.

3.1.24.3 Mitigation of Fire Protection Impacts

The reservoir would supply a new and readily available source of water for the suppression of wildfires. In addition, fire hydrants would be located on the pipeline in the service areas.

3.1.25 Schools

3.1.25.1 Existing School Conditions

It is anticipated that most of the construction workers (up to 126) would be housed in the city of Roseburg (population 16,600) approximately 30 miles south of the project area and in the smaller and closer communities of Oakland (population 800), Sutherlin (population 5,042) Yoncalla (population 1,220), and Drain (population 1,740). All have schools grades K through 12.

3.1.25.2 Impacts to School Conditions

During the construction period, the work force would peak at 126 during the third year of construction. It is estimated that approximately one-half of the work force would be married having an average of 2 children per family. Since most (approximately 80 percent) of expected work force presently reside in the local area, their children's needs for school are already satisfied. The remaining 20 percent of one half of the work force of 126 persons who are married with children and move into the area would require schooling. This would indicate that approximately 25 new children would require schooling.

It is anticipated that the schooling needs of 25 children would be easily absorbed by the local school districts, and therefore no significant adverse impact would be created. Operation of the project would not impact schools.

3.1.25.3 Mitigation of Impact to Schools

None is planned because no significant impacts are anticipated.

3.1.26 Health Facilities

3.1.26.1 Existing Health Facilities

The nearest health facility to the proposed dam site is the Drain clinic, approximately 20 minutes travel time by car. Travel time to either of the two hospitals in Roseburg is approximately 45 minutes. These hospitals have a 234 total bed capacity.

3.1.26.2 Impacts to Health Facilities

No significant adverse impacts to existing local health facilities are anticipated from construction or operation activities of the proposed project.

3.1.26.3 Mitigation of Impacts to Health Facilities

No mitigation is anticipated since no significant adverse impacts are expected.

3.1.27 Energy

3.1.27.1 Existing Energy Conditions

There are no electrical or other types of energy production facilities in the Elk Creek subbasin. Other than energy in the form of fossil fuels consumed by homes, automobiles and farm equipment, there are no other consumptive uses.

A high voltage electric transmission corridor transects the proposed reservoir area. A natural gas pipeline parallels Interstate 5 through the subbasin.

3.1.27.2 Impacts to Energy

No existing local source of energy production or consumption would be affected by the proposed project, however large amounts of energy in the form of fossil fuels would be consumed during construction of the project. Large quantities of fuels would be needed for operation of the heavy construction equipment for quarrying, transportation of materials and spoils, road construction, relocation and maintenance, and dam construction. Minor amounts of electrical energy would be needed during the construction phase. Project operation would require minor amounts of fossil fuels and electrical energy. Recreational users of the reservoir would consume additional fossil fuels in the vehicles and boats. No significant impact or energy consumption is expected during construction or operation of the proposed project.

3.1.27.3 Mitigation of Energy Impacts

No mitigation measures are planned.

3.1.28 Secondary Impacts

Primary impacts which would result from the construction and operation of the Milltown Hill project would, in turn, cause minor beneficial and adverse impacts of a secondary nature. These secondary impacts would, for the most part, be long-term and insignificant and would not extend beyond the boundaries of the Elk Creek subbasin. It is anticipated that in the long-term, increased population and industrial diversification within the subbasin will require increased public services, such as sewage disposal and solid waste disposal. These increases in service should be readily absorbed by local and County agencies. Although project construction would be completed within a 4-year period, certain construction and operation impacts would extend for the expected 100-year project life and beyond. Some of the secondary impacts which can be expected as a result of project construction are listed below:

- Land use within the subbasin may change slightly. Agricultural lands presently not irrigated or irrigated only when water is available, would receive adequate irrigation. This condition would lead to more and better crop production which, in turn, would result in higher income levels for farmers. This beneficial change would develop slowly over a long time period. No significant changes in land use that would affect wildlife habitat are expected, except for the clearing and filling of the 680-acre reservoir.

- Construction of the project may change existing land use practices in the dam's watershed area. The 17,500-acre watershed is mostly timbered (forest, farm-forest), with a small percent of farmland (grazing). Land use by ownership within the watershed is shown below:

Land Use	Ownership (Acres)				
	Federal	County	Private	Totals	Percent
Forest	5,500	300	4,500	10,300	59
Farm-Forest	-----	300	3,800	4,100	23
Farm (grazing)	-----	----	3,100	3,100	18
Totals	5,500	300	11,400	17,500	100
Percent (%)	31	4	65	100	

Source: Pers. Comm., Douglas County Planning Department, November 5, 1991.

Since the reservoir would become a reliable source of municipal and industrial water, it can be expected that water quality standards would need to be enforced in the watershed. This could lead to changes in land use practices within the watershed. Timber harvesting and growing practices may need to be changed to guarantee potable water in the service areas. The future use of pesticides and herbicides within the watershed may be restricted. Rural homesite construction within the watershed may be restricted or even prohibited to prevent surface water and ground water contamination and to lessen the risk of wildfires, which could result in soil erosion and decreased water quality. Mercury mining may not be permitted, to protect water quality in the reservoir and downstream.

- The reservoir would provide new recreation opportunities. The predicted 50,000 day visits per year for water-oriented sports would more than double traffic on County roads #7 and #8. The increased traffic would cause congestion on these narrow, winding roads. The probability of traffic accidents would increase. The increased traffic load would also require the County to increase road maintenance. These roads may require realignment and widening.

- Day use of the reservoir, with increased vehicular traffic, and dispersed recreation, would increase the risk of man-caused wild fires in the vicinity of the reservoir. The Douglas County Forest Protective Association may need to increase fire patrols in the area. Some increased level of air pollution and noise can also be expected because of these activities.

- The predicted recreational use of the reservoir and surrounding lands would generate increases in retail businesses in Yoncalla and Rice Hill. There would be increased demand for overnight lodging, food, sporting goods and fuel, and possibly vehicle repairs. All this would stimulate the economy in the project service area. These services would be made available within the existing commercial areas of these communities.

- The new pipeline would provide a reliable source of potable water to Yoncalla, Rice Hill, and nearby rural homesites. Expanding economic growth in the subbasin would probably result in new residential and industrial construction, and increased volumes of municipal, industrial and rural solid wastes. There would be the need to improve the solid waste disposal program in the subbasin.

- The release of 7,737 acre feet of water reserved to enhance anadromous fisheries habitat would require close annual coordination among Douglas County, ODFW and NMFS, and the District 15 Watermaster. A program would need to be developed annually for the timely release of pre-smolts. A monitoring program of stream flows and stream temperatures would need to be implemented to assure optimum spawning conditions and smolt survival. The program would require continuing efforts by these agencies, in addition to their present responsibilities.

- Anticipated increases in anadromous fish production in Elk Creek would result in increased catch in the sport and commercial fishery in the Umpqua Basin and offshore.

- The project would release water during dry summer months when flows have been historically naturally low to zero. This would result in a slight increase in flow in the mainstem Umpqua River during summer months. Conversely, water storage during winter months would result in a slight decrease of flow to the mainstem Umpqua during these months.

- The reservoir would provide new habitat for bald eagles and osprey. These raptors would be attracted to and probably become established in the area since the reservoir fisheries would serve as an ideal source of food. The forest land surrounding the reservoir would provide ideal nesting conditions for these species.

- Construction of the project would affect the 3 existing high voltage powerlines which traverse the upper end of the proposed reservoir. It will be necessary to construct a 3-acre island on which the powerline transmission towers would be relocated. Costs of tower relocation, including the costs of power disruption, would be borne by the County.

- Relocation of segments of County roads #7 and #8 would be required. This would also require the relocation of approximately 3 miles of underground utility cable which presently parallels the existing road. Costs of utility cable relocation would be borne by Douglas County.

3.1.29 Cumulative Impacts

There are limited opportunities for development of projects in the Elk Creek subbasin other than projects related to highway relocation and improvement. There are no existing or anticipated state or federal water resource projects in the Elk Creek subbasin. The cities or County do not anticipate any projects similar to the scale of the proposed project. The proposed Milltown Hill project would probably be the only major water development project in the Elk Creek subbasin. During the search for the most desirable project site, the County and Bureau of Reclamation considered more than a dozen locations which would meet the geological, physical, and biological requirements and also provide downstream municipal, industrial and irrigation water needs. Interbasin water transfer was also considered. The proposed project would not cause or become a source of cumulative water resource impacts in the subbasin.

The Douglas County Water Resources Management Plan, originally developed in 1979, and updated in 1989, recognizes the need for water resources development. The purpose of the plan is to ensure an adequate quantity of water for beneficial uses within the County. The County believes that an assurance of consistent water availability will lead to greater stability in the County's natural resource-based economy.

The Milltown Hill project is to be considered a major water development project in the Elk Creek subbasin. The County has supported several water development projects during the during the past decade. These include Berry Creek Dam, a municipal project completed in 1980, Canyon Creek Dam completed in 1982, and Galesville Dam and reservoir completed in 1986 under the Small Reclamation Projects Act. Galesville Dam is located in southern Douglas County and is about 50% larger than the proposed Milltown Hill project.

In addition, Douglas County is developing a Coordinated Resources Management Plan for the Deer Creek subbasin. This project would address flood control and irrigation needs. A 12,000-acre-foot impoundment is anticipated. The County is also actively studying the need for a 12,000 acre-foot impoundment on Gassy Creek to meet needs for future municipal and industrial requirements in the cities of Sutherlin and Oakland, and irrigation requirements along Calapooya Creek. Douglas County believes that such projects including the Milltown Hill project will, cumulatively, increase opportunities for economic diversification by encouraging those industries that have expressed interest in the area, but have been deterred from investing capital, due to the lack of an assured water supply.

3.1.30 Residual and Unavoidable Adverse Impacts

There are residual and unavoidable adverse impacts that would occur during the 4-year construction period and during the operation period.

3.1.30.1 Air Quality, Noise, and Visual Quality

The 4-year construction phase of the project would produce minor, short-term adverse impacts on local air quality. Exhaust emissions from construction vehicles and fugitive dust would decrease air quality in the reservoir area. Noise levels at the dam and quarry site would temporarily increase due to onsite machinery and to vehicles transporting materials. Increased noise levels would also be associated with clearing and grading operations for the relocation and construction of roads where necessary and would extend outside the immediate reservoir vicinity along County Roads #7 and #8 affecting local residents.

Impacts on visual quality include exposed soils and topographic change (especially at the Otten Quarry, located above the high water level), some sedimentation of Elk Creek, presence of large construction machinery and stockpiled materials, piled debris and excavation materials, and rechanalization of Elk Creek through a conduit. Construction and operation would also result in increased human activity in this low-use area this could be objectionable to local residents.

3.1.30.2 Vegetation

Construction of the dam would result in the inundation of 680 acres at the reservoir site. This includes some 260 acres of land in agricultural use (including the home sites), 364 acres of commercial forest land and 56 acres of sparse riparian growth. Additional clearing would be required for the penstock, recreational facilities and access roads to the reservoir and dam, including County Roads #7 and #8. Loss of the agricultural and timber land and riparian land cannot be mitigated. Loss of agricultural production, however would be offset by increased productivity of lands irrigated by the project.

3.1.30.3 Fish and Wildlife

Wildlife would lose the 680-acres of habitat to be occupied by the reservoir. Less-mobile animals such as small mammals, reptiles, and amphibians would be killed directly during construction and filling of the reservoir. Nesting birds would be directly affected since their habitat would be eliminated. Wildlife displaced from the project area by construction activities and subsequent inundation would compete for food and space on adjacent lands, the net result would be a reduction in wildlife populations roughly equal to the number of animals occupying the inundated acres. This would be partially mitigated by managing the clearing in the upper reservoir to help minimize loss of wildlife habitat.

Development of the reservoir would cause the loss of over 4.5 miles of free-flowing stream environment in upper Elk Creek. This loss would affect the benthic macroinvertebrate and fish communities utilizing the section of Elk Creek inundated by the reservoir pool. The dam would prevent anadromous fish from using this segment of Elk Creek.

3.1.30.4 Social Conditions

Ten households including 26 people would be relocated as a result of the proposed project. This constitutes the greatest unavoidable adverse social impact of the project. This group's quality of life and social well-being would be affected . They are presently affected by the prospect of losing their homes, being extracted from a community they may have been instrumental in building, and dealing with unknown problems of resettlement, possible re-employment, and social re-establishment. Their concerns can be only partially alleviated by monetary compensation.

3.1.30.5 Water Quality

Short-term construction-related impacts on surface water include unavoidable increased turbidity and suspended sediments. These impacts are expected to be temporary and minor, since settling ponds, berming, and filtering would be used to control most sedimentation and turbidity. The potential also exists for petroleum product spills during construction, which could reduce water quality and be toxic to aquatic organisms for short periods of time. To minimize the potential for these occurrences, the contractor would prepare spill control plans.

During its initial years of operation, the reservoir, like any new reservoir, will have reduced water quality due to decomposing organic materials, nutrient leaching from the soil, and erosion. These factors could cause suspended sediment increases, turbidity increases, algal blooms, and dissolved oxygen reductions in the reservoir. These effects would continue downstream for an unknown distance.

The water level in the reservoir would cause a corresponding rise in the existing ground water level in the immediate pool vicinity. This rise in the ground water level has the potential to adversely affect the stability of the slopes adjacent to the reservoir and could result in minor soil sloughing.

3.1.31 Relationship Between Short-term Uses of the Environment and Long-term Productivity

The short-term uses of the project area are increased construction employment and local economic stimulation. The long-term productivity of the project include:

- Improved anadromous fish production in Elk Creek
- A reliable year-long source of water for municipal, industrial, fish and wildlife, agriculture and recreation
- Improved flood control along Elk Creek
- New warm water and cold water fishery in the reservoir
- Increased agricultural production
- New habitat for waterfowl
- Improved water quality
- A new long-term source of flat water recreation activities
- Increased productivity of wetlands
- Increased opportunities for economic diversity
- Increased secured habitat for the Columbian white-tailed deer.

Providing water for the above uses represents a long-term commitment of a natural resource.

The long-term productivity of agricultural lands would be enhanced by the project through irrigation. Productivity increases on irrigated lands would more than offset productivity lost due to inundation of agricultural lands in the reservoir area.

The fishery enhancement program represents a long-term commitment of water for augmented streamflows. Fish production in Elk Creek would be enhanced throughout the life of the project.

Long-term wildlife production would diminish in the project vicinity (except for waterfowl and raptors) by removal of habitat which would be occupied by the reservoir and appurtenant project facilities.

The productivity of industries that currently run the risk of curtailed operations due to water shortages would be increased over the long term. Similarly, a reliable source of water would allow new industries to be established. The recreation features of the project would result in a long-term increase in recreation opportunities in the area.

Project area residents who live downstream from the dam would likely perceive a reduction in their quality of life due to increased human use of the reservoir, because of the high value they place on the natural beauty of the area, the slow-paced, quiet rural life, and the close personal connections among residents. These values would be further compromised during dam construction by relocation of friends and neighbors, increased traffic, increased noise and dust, and the presence of strangers.

The community of Drain and property owners below the dam would benefit by a slight reduction in the effects of floods on Elk Creek. This would represent a long-term benefit. Reduction in flood levels during high flow months and increased flow in summer would improve water quality during these periods. These represent long-term benefits.

Some residents in the project area could feel a long-term sense of decreased quality of life resulting from increased traffic, noise, presence of recreationists, and the changed appearance of the area. Although these social effects cannot be completely offset, they would be counter-balanced by the quality-of-life improvements in the water service areas. These would include reliable water supply, potential for economic growth, enhanced crop production, reduction of flood losses, and sport fish enhancement. The project would allow continued population growth, unconstrained by limitations of water availability.

3.1.32 Irreversible and Irretrievable Commitment of Resources

Financial resource commitments to a project of this magnitude include primarily the capital loan, interest, labor, materials, and energy used in project construction, operation, and ultimate abandonment. Additional capital, labor, materials, and energy resources would be irretrievably committed in maintaining the proposed facilities.

The provision of flows for fish habitat maintenance and enhancement would require a firm guaranteed water allotment for that purpose. Commitments to other project functions must remain in an irreversible and irretrievable status to provide a viable project. Any change in any of these commitments for the use of water would severely affect the achievement of these functions.

Soil losses during construction and operation would be irreversible.

The loss of agricultural and timber lands located in the reservoir area would be an irreversible commitment.

Permanent alterations of the landscape would be irreversible commitments of visual and scenic values.

The loss of habitats and individual plants and animals during construction of the control building and access roads would be irreversible and irretrievable.

Any undiscovered archaeological resources inadvertently destroyed or flooded would be irretrievably lost.

3.2 Environmental Consequences of the No Action Alternative

The proposed project area would remain in its present condition if no action was taken. The identified needs of the county and of the residents of the service area would not be realized. In addition, enhancement opportunities for natural resources would not be realized.

The environmental components which would remain unchanged if the project was not constructed are geology, topography, seismicity, soils, mineral and aggregate resources, climate, air quality, vegetation, wetlands, timber, threatened and endangered species, wildlife, noise, cultural resources, recreation, and visual resources.

A summary comparison of the impacts of a no-action alternative and the preferred alternative is shown in Table S-2. The following discussions focus on the impacts on those environmental components which would be affected if the project was not constructed.

3.2.1 Land Use

The land area proposed to be occupied by the dam and reservoir would continue to be used as it is now. No new irrigation development is possible without surface water storage. Lands presently without sufficient sources of water will continue to suffer from that problem, and the economic potential of the land would not be realized. The agricultural areas in Scotts Valley, Yoncalla Valley, and areas bordering lower Elk Creek would probably continue to be used primarily for livestock production. Such production would continue at present low levels due to the lack of water needed for irrigation. The areas occupied by the towns of Yoncalla, Drain and Elkton would remain the primary urban communities, showing little or no expansion. A small increase in rural homesites would occur.

3.2.2 Public Water Supply

Yoncalla would continue to rely on the diversion of water from Adams Creek. This source is not reliable. Water quality is unsatisfactory, since it is stored in a shallow 100 acre-foot reservoir. There would be no water for the expansion of existing industries or introduction of new industries in Drain, Yoncalla, or the Rice Hill area.

3.2.3 Surface Water Quantity

Summer flows in the lower segments of Elk Creek would continue to decrease as demands for irrigation water increase. Flow decreases would result in water temperature increases and dissolved oxygen decreases. Floods would continue to be an unresolved problem in lower Elk Creek.

3.2.4 Surface Water Quality

Water quality would remain much as it is today. Some minor improvement in suspended sediment and color could result if restrictions on harvesting old growth timber are enforced. Increased demands for surface water would increase with a resultant decrease in water quality due to increased domestic waste discharge expected with slight increases in population.

3.2.5 Ground Water

Slight increases in rural home construction in the project area can be expected in the future. This would further increase the demand for domestic water, resulting in further depletion of ground water in the vicinity of Drain, Yoncalla, and Rice Hill as well as in areas downstream from Drain.

3.2.6 Anadromous Fish Habitat

The fisheries resource would remain much as it is today, since few actions to improve habitat are likely. Low summer flows and poor instream habitat would continue to limit resident and anadromous fish populations. Decreases in water quality would likely adversely affect fisheries resources.

The 4 1/2 mile segment of Elk Creek which would be occupied by the proposed reservoir would remain as habitat for anadromous and resident fish. The lower reaches of Elk Creek and its tributaries would continue to be marginal spawning habitat for anadromous fish, due to low flows and high water temperature during the irrigation season.

3.2.7 Population

The displacement of 26+ persons from their homes in the reservoir area would not be necessary. Without new industries, the population of Drain and Yoncalla would grow slightly, but not as rapidly as Douglas County or the State of Oregon. A slight increase in rural population can be expected in Elk Creek subbasin, since people who prefer the rural quality of life will build homes, and commute to Eugene or Roseburg for their livelihood. A small increase in population may occur from in-migration of retirement-age people. This would probably be offset by the out-migration of younger people looking for livelihood in Roseburg or Eugene, or other metropolitan areas.

3.2.8 Economic Growth

Opportunities for economic growth and diversity in the communities of Drain, Yoncalla, Rice Hill and Elkton would not be realized, due to the lack of water for irrigation and industrial use. These communities would continue to have their economy based on jobs relating to the wood processing industry, which could face further decreases in production in the near and not-so-near future.

Douglas County has placed the Elk Creek subbasin as its first priority among several small water development projects in the County. The County has also indicated that if the preferred alternative cannot be identified as a feasible project then it will place the Milltown Hill storage plan in an inactive status and pursue studies in other tributaries to the Umpqua River. The County would reconsider Elk Creek in the future and determine if conditions had changed sufficiently to warrant a renewed attempt to develop the project. Termination of the study would preclude any significant growth or economic stabilization within the Elk Creek subbasin.

The Federal government is in the process of developing a recovery plan for the threatened Northern spotted owl. The plan could call for a significant decrease in timber harvests on federal lands. Large, old-growth forest areas characteristic of Douglas County will be particularly affected. The anticipated reduction in timber harvest could result in a decline in forest products production, and Douglas County could likely experience an outmigration of people and high unemployment. Such a situation will reduce County income, increase costs for assistance programs, increase social problems, and intensify the need for economic diversity and stabilization.

A drop in County revenues will make developing an infrastructure to attract new business more difficult. Since 1980, Douglas County has invested over $19 million of Oregon and California (O&C) timberland revenues in water resource projects. The future availability of O&C revenues for water resource development may be in jeopardy, as these funds may be diverted to provide for other social needs resulting from anticipated high unemployment. If the project is not developed, the existing social problems will not only continue but may worsen as a result of the mandated reductions in timber harvests.

The community of Rice Hill can only absorb a limited amount of additional growth. Growth in the Rice Hill area will occur only if private wells are developed. Ground water in the Rice Hill area is difficult to find in quantities sufficient for domestic needs, and water quality has been a problem.

The City of Yoncalla is currently limiting expansion of its water system. While the city could possibly enlarge its current 100-acre-foot off-stream reservoir and increase the capacity of its Adams Creek pumping plant and pipeline, Adams Creek flows are too uncertain to significantly help the community.

The City of Drain has a water right to store 1,000 acre-feet of water at its Bear Creek reservoir, but site engineering conditions make enlarging the current reservoir unlikely. This situation would limit future growth in Drain.

Some rural domestic growth may occur elsewhere in the subbasin by using local ground-water supplies. However, land use restrictions on subdividing property would limit this type of growth.

3.2.9 Flooding

Periodic flooding would continue in the future. The subbasin would continue to suffer an average of $205,000 in flood damages annually.

4.0 CONSULTATION AND COORDINATION

4.1 Introduction

The Bureau of Reclamation and Douglas County have attempted to involve all concerned Federal, State, and local agencies as well as the public throughout the data gathering and analysis processes. Early in the planning process, several issues of concern were raised, and as the process developed, other issues became known. This process has been followed, concerns were addressed as they arose, and all appropriate data were considered in formulating the County's preferred alternative (Table 4-1). In addition, environmental committments were developed (Appendix B). The following discussions summarize the record of consultation, coordination, and public involvement and how the activities were used in the decisions and planning of the project.

Agencies involved in the environmental process include the Fish and Wildlife Service, National Marine Fisheries Service, Bureau of Land Management, and Oregon Department of Fish and Wildlife. The Fish and Wildlife Service prepared a Coordination Act Report and reviewed the Bureau of Reclamation's Status Report and Environmental Analysis. Fish and Wildlife Service comments on the latter and Bureau report of Reclamation responses are in Appendix C.

Contacts made for recreation planning included the Oregon Department of Transportation (Parks and Recreation Division) and the Douglas County Parks Department. Contacts regarding historic and cultural resources included the State Historic Preservation Office and the Douglas County Museum. The U.S. Army Corps of Engineers participated in flood studies by reviewing study work and preparing the economic analysis. The Bureau of Land Management was consulted on right-of-way issues on land it manages and is a cooperating agency on preparing this EIS. Consultation with the Bureau of Mines was initiated to obtain an evaluation of the potential for commercial recovery of minerals in and near the project area. The Soil Conservation Service conducted soil classification surveys on the service areas and on the project "take" lands, including the reservoir area. The Geological Survey was consulted regarding ground water availability and quality and ground water movement in the subbasin. The Oregon Department of Environmental Quality was notified of the proposed project and provided information. The state of Oregon A-95 Clearing House Process also was utilized (Appendix D).

This Section is a chronological summary of consultation and coordination on the following issues:

- Public Involvement
- Water Quality

Table 4-1. Environmental Concerns and Action Taken to Evaluate Concerns for the Proposed Milltown Hill Project.

RESOURCE	CONCERN	ACTION TAKEN TO EVALUATE CONCERNS
Agriculture	Determine acres of agricultural land and Prime and Unique farmlands that would be lost by inundation of the reservoir. Determine location of existing and potential irrigable lands in the service areas.	Conduct soil surveys and land capability classification of the service area and reservoir areas to determine acres of Prime and Unique farmlands. Design an irrigation system and schedule which would alleviate present water shortages during irrigation season. Develop water release schedule which would provide for optimum use on irrigable lands.
Air Quality	Determine if construction and operation of the project would adversely affect regional air quality standards.	Obtain federal and state air quality standards, determine if the project is located in a Class I region.
Climate	Identify climatological factors which would affect project construction and operation.	Obtain climatological data, including temperature, rainfall, snowfall, flood patterns.
Commercial Timber	Determine extent of commercial timber resources to be affected by the project.	Survey timber resources within project take line to determine timber ownership, condition, volume and value. Estimate timber-producing lands which would be irretreivably lost due to project construction.
Cultural Resources	Possible inundation of significant historic and prehistoric resources.	Conduct literature search of documented prehistoric and historic activities and structures. Conduct a Class III survey within the project take line. Assess results. Conduct test excavations of 3 known archeological sites and other probable sites. Consult with SHPO to determine site significance Develop mitigative measures on sites which would be affected by the project.

Table 4-1. (Continued)

RESOURCE	CONCERN	ACTION TAKEN TO EVALUATE CONCERNS
Fisheries	Dam would block upstream movement of anadromous fish and cause the loss of habitat on 4 miles of mainstream and 2 miles of tributaries for anadromous and resident game and non-game species. Slightly lower project flows than during pre-project winter and spring high flow period. Higher flows of cooler water than during pre-project summer and fall low flow periods. Lower summer water temperatures may affect the habitat of the Umpqua Oregon Chub, a Special Status Species	Conduct fisheries and habitat surveys of Elk Creek. Conduct instream flow studies (IFIM) in Elk Creek. Do reservoir modelling to predict water temperatures and flow releases. Do stream temperature modelling to predict water temperature downstream from the reservoir. Analyze stream temperature modelling to determine if project flow temperture would be critical to fish species. Develop enhancement plan for coho, winter steelhead and fall chinook. Develop monitoring plan to evaluate water temperature and enhancement.
Flood Control	Will the project help control periodic flooding in lower Elk Creek.	Estimate possible flood levels at Drain resulting from operation of the project.
Geology, Seismicity	Determine geologic and seismic integrity of damsite and reservoir area.	Research literature and previous studies in area. Investigate damsite foundation to determine rock weathering, jointing, permeability, depth of overburden. Determine subsurface conditions. Conduct seismotectonic study of the area.
Ground Water Availability	Assess local ground water availability, to determine if ground water could be developed as a feasible alternative to the proposed project.	Search records to determine yield of existing wells, examine geological conditions to assess ground water storage capabilities.
Land Use	Conversion of an agriculturally oriented valley to a water storage reservoir.	Determine if this irretrievable action can be mitigated.
Mineral and Aggregate Resource	Determine if the proposed project would affect the mineral and aggregate resources in the project area.	Bureau of Mines conducted a literature search of existing and past mining activities, and areas having mineral and aggregate resources.

F:EVALUATE

Table 4-1. (Continued)

RESOURCE	CONCERN	ACTION TAKEN TO EVALUATE CONCERNS
Municipal Effluents	DEQ requirements are not presently met at all times in Yoncalla and Drain.	Develop Flow Requirements in Elk Creek for improving effluent assimilation.
Noise	Determine if construction and operation of the project would exceed federal and state noise standards.	Obtain federal and state noise standards. Develop construction contract specifications to conform with standards developed by Oregon Department of Environmental Quality.
Recreation Facilities	Project would change the present recreational use of the reservoir area.	Estimate the extent of loss of present recreation activities within the reservoir area. Estimate the extent of flat-water recreation activities which would be generated by the project. Estimate the cost of constructing recreation facilities. Estimate the recreational benefits generated by the project.
Socio-econmic Conditions	Displacement of 10 families and their households. Lack of economic diversity in the area to be served by the project. Would domestic water be avaiable for Rice Hill, Yoncalla and Drain.	Determine amount of payment for loss of property and costs of relocation. Develop water release schedules which would provide water for increased domestic and industrial and agricultural uses.
Soils, Land capability of service areas	Determine extent of areas to be irrigated. Determine soil capability in service areas. Determine extent of prime and unique farmlands.	Soil Conservation Service undertook soil surveys in the service areas and in the reservoir area.

F:EVALUATE

Table 4-1. (Continued)

RESOURCE	CONCERN	ACTION TAKEN TO EVALUATE CONCERNS
Surface Water Quality.	Determine if existing surface water quality meets the EPA criteria for drinking water and irrigation.	Obtain surface water quality data from Oregon Department of Environmental Quality. Obtain samples of surface water from Elk Creek to determine mercury content. Evaluate stability of mine tailings. Determine locations of major discharges of domestic waste water. Model reservoir water temperatures to determine temperatures of release water. Model downstream change in water temperature under project operations. Prepare application for Section 401 certification and submit to DEQ.
Surface Water Quantity	Determine if anticipated water yield would meet the water demand in the service area. Determine if County can provide at least 5,000 acre-feet of storage for fish enhancement.	Estimate water needs of potential rural and urban users. Estimate monthly and annual water yield of the impoundment.
Topography	Provide accurate topographic data and elevations for design information.	Obtain aerial photography to develop topographic maps at 1" = 100 ft, with 10-ft contour interval, conduct land surveys.
Trace Elements	Will the reservoir develop concentrations of mercury unsafe for public drinking water and public comsumption of fish.	Assess mercury concentration in Lane Creek and Elk Creek near the Elkhead Mine. Determine if geologic formations in the reservoir area would expose high levels of cinnabar. Locate and map mine tailings in relation to reservoir take-line.
Transportation	Would construction and operation of the project affect existing transportation conditions.	Estimate current vehicle traffic on County Roads #7 and 8. Estimate need to relocate roads due to project construction. Estimate vehicle traffic during construction and operation of the project.
Vegetation	Determine types and extent of vegetation which would be inundated by the project. Determine extent of wetlands which would be affected by the project. Identify T&E plant species.	Field type and calculate acreages of vegetative types. Identify wetlands. Field check reservoir area and service areas for T&E plant species.

Table 4-1. (Continued)

RESOURCE	CONCERN	ACTION TAKEN TO EVALUATE CONCERNS
Visual Resource	Changes in visual quality of a portion of Elk Creek valley occupied by the reservoir.	Develop recreation sites with landscaped features. Landscape realigned roads, causeways.
Wetlands	Do jurisdictional wetlands exist in the project area.	Soil Conservation Service, Fish and Wildlife Service surveyed the project area. The agencies recommended actions to mitigate any loss or degradation of wetlands.
Wildlife	Determine the impacts of the project on wildlife and their habitat. Determine if T&E Species (Columbian White-tailed Deer, Northern Spotted Owl, Bald Eagle) would be effected.	Identify species of wildlife most likely to be affected by reservoir inundation. Determine extent of habitat loss due to reservoir inundation. Develop measures to mitigate impacts to wildlife, both on-site and off-site. Survey the area surrounding the project to determine the existence of the spotted owl. Develop methodology for protecting Columbian white-tailed deer.

- Flood Control
- Environmental Coordination
- Threatened and Endangered Species
- Fisheries
- Instream Flows
- Stream Temperature
- Wildlife
- Wetlands
- Cultural Resources
- Recreation

4.2 Chronology of Consultation and Coordination

1985

Public Involvement

On November 26, the Douglas County Commission and Bureau Reclamation (BR) signed a Memorandum of Understanding (MOU) initiating Northern Douglas County Cooperative Water Resources Study. The study covered the need of further exploring potential damsites in the Calapooya and Elk Creek subbasins in northern Douglas County. The MOU defined each agency's role in the study. A multidisciplinary team was formed which included staff members from both agencies. A plan for the study was formulated. Each team member was assigned one or more environmental or engineering components of the study. Each member would develop an "appendix" which would be incorporated into an environmental assessment of the project.

The signing occurred at a public meeting of the commission. The Commissioners and BR held a short press conference in conjunction with the signing. BR mailed the notice of initiation of the study to the media, federal and state agencies, and groups with a known interest in BR activities. Responses to the notice of initiation were received from the Oregon Water Resources Department (WRD), Oregon Department of Land Conservation and Development, and the Douglas County Soil and Water Conservation District (SWCD).

Flood Control

Upon receipt of BR's notice of initiation of a study in Elk Creek, the Oregon Department of Land Conservation and Development contacted BR expressing its concern over flooding along Elk Creek. The agency offered its records for the flood control analysis.

Upon receipt of BR's notice of initiation of a study in Elk

Creek, the SWCD contacted BR to express its concerns over flooding problems along Elk Creek. The SWCD noted that it was involved in flood control activity along Elk Creek.

Environmental Coordination

In December, BR conducted an orientation trip for Fish and Wildlife Service (FWS), National Marine Fisheries Service (NMFS), Oregon Department of Fish and Widlife (ODFW), and Bureau of Land Management (BLM). Shortly after the trip, BR requested a planning aid letter (PAL) from the FWS for input into a preliminary findings memorandum (PFM).

Instream Flows

The SWCD responded to the notice of study initiation by stating its concern over the need to improve instream flows in Elk Creek to benefit irrigation, fish, and wildlife.

1986

Public Involvement

Douglas County held a public information meeting on January 7 in Drain. The County discussed the study, however most of the comments from local residents involved SWCD flood control activities along Elk Creek in Drain.

Water Quality

Naturally occurring deposits of heavy metals are common in portions of Douglas County, including the Elk Creek basin. Of particular concern to the project is the abandoned Elkhead Cinnabar Mine near the east edge of the reservoir site. BR met with the mine caretaker in the early spring to tour the mine area and make arrangements for future access, if needed. BR identified sampling sites on this tour. Water samples were subsequently taken from the mine area and immediately downstream from the mine site.

In the summer, BR contacted the Oregon Department of Environmental Quality (DEQ) regarding wastewater treatment facilities in the basin and the potential for using project releases to reduce treatment costs. This potential was very minimal.

In the late summer, BR and the County determined that fish tissue sampling for mercury and other heavy metals would help answer the question regarding contamination from the Elkhead Mine. The County consulted with ODFW and FWS on this approach.

Flood Control

Douglas County consulted with Corps of Engineers (Corps) regarding flood control data and analysis needed for the Elk Creek studies. Contacts were with study staff involved with a potential storage project in southern Douglas County. BR also contacted the Corps regarding flood analysis on Elk Creek. Comparison of discussions indicated that the County and BR were dealing with two different parts of the Corps' organization. BR sent a formal request for assistance to the Corps in November asking for a flood control benefit analysis.

FWS, Douglas County, and BR visited the confluence of Billy Creek and Elk Creek in December to look at a reported problem with the flow of Billy Creek that increased flooding in Drain. The field review identified potential wildlife impacts from re-routing the Billy Creek outflow.

Environmental Coordination

ODFW and FWS worked on the input needed for the PFM. The FWS sent the draft PFM to BR on March 29.

BR received a notification from BLM of its Resource Management Planning activity in the Elk Creek area in September. BR sent a letter requesting consultation on its planning.

BR requested a planning aid letter (PAL) from the FWS with a completion time in the fall of 1986. The County provided photo and mapping for the PAL. BR received the PAL in December.

Instream Flow

Douglas County provided previously performed instream flow results to NMFS and FWS. Review by these agencies indicated a need to perform new instream flow studies. Further discussions in a joint meeting indicated that the basic Instream Flow Incremental Methodology (IFIM) data had been recorded in a modified method, and the data would be suitable if it were reworked to a more suitable format. The agencies hoped to rerun the IFIM studies using the available data, but a check showed that the original computer files were destroyed and rerunning the model would require recoding and reentering the data. The fishery agencies provided a tentative set of instream flows based on the available IFIM analysis in the FWS PAL of December 8.

Discussions in June with WRD indicated the state had never assigned economic benefits to improved instream flows for water quality purposes. WRD indicated that the Water Resources Commission would support storage for providing minimum flows in Douglas County.

Threatened and Endangered Species

FWS provided BR with a list of Threatened and Endangered Species.

Stream Temperatures

It was decided that stream temperature projections for Elk Creek would be done by extrapolating current temperature data from the Galesville project, since the only temperature readings on Elk Creek were taken at the Elkhead gage, located 1 mile downstream from the Milltown Hill site. Douglas County provided the Galesville data to FWS.

Wildlife

The FWS prepared a planning aid memo (PAM) on April 29 for BR's preliminary findings memorandum of May 15. The PAM prepared provisional concepts of impacts and potential mitigation to wildlife, as a result of construction and operation of the reservoir. Douglas County and FWS met late in the year to discuss mitigation concepts.

Cultural Resources

The Douglas County museum prepared a report on historical and cultural resources in the study area. The report included an inventory of standing structures that might be eligible for listing in the National Register. This report provided background for the Class I Survey.

Recreation

BR met with Douglas County Parks Department staff regarding recreation problems and needs in the study area. The county agreed that despite current SCORP projections, construction of a reservoir in the Milltown Hill area would result in increased recreation use.

1987

Public Involvement

BR briefed the Umpqua Water Resources Development Association on June 25 regarding the study. At a public meeting in Sutherlin on August 18, a member of the Douglas County Commission predicted that the reservoir at Milltown Hill would begin filling in 1991. The County held public meetings on December 16 with the Water Advisory Committee and the Umpqua Water Resources Development Association.

Water Quality

In early winter, the FWS agreed to have its laboratory perform the fish tissue sampling. However, internal contacts within the FWS indicated that the samples would not receive the rapid processing that the study needed. As a result, the FWS agreed to split the fish tissue sample and allow the County to contract an analysis on half the sample with the Umpqua Research Laboratory. ODFW and the FWS collected the fish tissue samples. Douglas County provided laboratory results to ODFW in late July. BR provided the results to FWS in early August.

Flood Control

The Corps responded to BR's request in January. The Corps promised a scope of work that would allow them to review the county flood reduction analysis and prepare an estimate of benefits. The Corps' scope of work arrived in February. Douglas County sent a letter to the Corps in March asking that they provide the needed assistance in the flood control study.

Douglas County provided the Corps with flood control data that it had gathered based on its earlier discussions with the Corps. The Corps reviewed the data and determined that additional data was needed. The Corps outlined the data needs and completed the study. Douglas County performed field work to survey structures and perform flood routing studies. BR provided flood routing studies through the proposed reservoir. Douglas County contracted with a consulting firm to complete the survey of structures.

Environmental Coordination

Most of the direct coordination involved technical analysis in other parts of this section of the report. BR informed FWS that it would be wanting analysis of two reservoir sizes at the Milltown Hill site.

Instream Flows

In the spring, BR, ODFW, and FWS met to discuss the tentative set of instream flows. The flows appeared too high considering the basin's hydrologic capability. The agencies decided that additional flow studies were needed and that providing flows for fall chinook should be eliminated. Subsequent discussions suggested that the IFIM be rerun using the existing data if possible. Douglas County agreed to contract for a reanalysis of the IFIM studies. The FWS provided language assistance to the County in preparing a scope of work for the IFIM reanalysis. Douglas County selected Campbell-Craven Environmental Consultants to perform the analysis.

ODFW reviewed the cross-section locations used in the IFIM study and confirmed that they were representative. The hydrologic record was extended for the IFIM study and with-project flows for reservoirs sized at 36,000 and 50,000 acre-feet were provided to the consultant. The agencies decided to eliminate small mouth bass and cutthroat trout from the analysis but to include fall chinook at a future time. A field trip was held in September to confirm transect weightings.

The agencies met again in the fall to discuss the progress of the IFIM re-analysis. ODFW, NMFS, and FWS helped Douglas County consultant select site specific suitability curves for Elk Creek. The group agreed to use the one-flow technique and to have the County perform a field review of Elk Creek habitat with the intent of dividing one of the reaches into two. ODFW, NMFS, and FWS chose the substrate coding for use in the modeling. The group decided to reduce the period of record to 30 years to use daily rather monthly means in the modelling. Douglas County consultant re-ran the IFIM with the new data and the agencies met again in the fall to review the model output.

Threatened and Endangered Species

In June, BR made a request for a list of threatened and endangered species. The FWS responded that the list provided in the 1986 planning aid memorandum was still valid. BR then prepared a biological assessment in which it determined that the project would not adversely impact either bald eagles or Columbian white-tailed deer.

Fisheries

Most of the fishery activity in 1987 involved instream flow studies. The reader is referred to the instream flow section for a discussion of those activities.

Wildlife

Discussions continued on mitigation concepts. The idea of developing wetlands in a sub-impoundment at the upper end of the reservoir pool was discussed, and ODFW, FWS, and BR toured the Fern Ridge wildlife area to view management practices potentially relevant to the wetland concept. Due to the lack of unique habitat in the reservoir area, the ODFW regional office in Roseburg, FWS, Douglas County, and BR agreed that negotiating a mitigation package was possible. The ODFW regional office identified some lands that they would consider as possible mitigation for the reservoir. In December, the FWS presented BR and Douglas County with a draft copy of a wildlife mitigation plan.

Cultural Resources

BR received the Douglas County Museum's final report. It awarded a contract to Heritage Research Associates, Inc. for a Class I Survey of the potential reservoir area.

Recreation

In July, BR and ODFW met with Douglas County Parks Department personnel to discuss recreation concepts, particularly as related to wildlife mitigation. The Parks Department subsequently met with the Douglas County Water Resources Survey to discuss recreation planning and land acquisition for recreation at the Milltown Hill site.

1988

Public Involvement

Douglas County conducted an interest survey of potential water users in the area of the gravity pressure pipeline. Douglas County mailed out questionnaires to all those on the tax rolls owning property in the pipeline service area asking if they would be very interested in purchasing water, moderately interested, or not interested. Of the 310 mailings, the County received 302 responses. Of those who responded, 56 percent were very interested, 25 percent moderately interested, and 0.6 percent thought the project was a bad idea.

A Water Advisory Board meeting was held in Yoncalla in December. The study status was discussed as were the results of the interest survey and Douglas County's update of its Water Plan.

Flood Control

BR mailed the last of the hydrologic data to the Corps in July. The Corps checked the hydrologic studies and completed the economic analysis. The Corps presented its analysis in December.

Environmental Coordination

In April, the FWS sent BR a draft planning aid memorandum (PAM) and a mitigation plan for Milltown Hill. BR, ODFW, Douglas County, and FWS discussed the concepts presented in the PAM. The PAM provided the initial discussion point for preparing the final mitigation plan.

Fisheries

The agencies began discussing a methodology for deriving fish benefits from the IFIM studies. Consultations between Douglas County's consultant, Campbell-Craven Environmental Consultants, who performed the IFIM studies and ODFW resulted in an agreement to use a habitat quality index for deriving benefits. The County's benefit analysis was sent to the cooperating agencies for review in March.

Instream Flows

Douglas County consultant prepared a final report on the IFIM study. Both the FWS and ODFW provided written comments on the report. At this point, the agencies had agreed upon the instream flows. The issue of temperature remained to ensure that the extra flows would provide improved habitat.

Stream Temperatures

Douglas County contracted with Campbell-Craven Environmental Consultants to review temperature operations at Galesville as part of the Galesville monitoring program. The consultant found that Corps of Engineers modelling of Galesville did not agree with observed reservoir or release temperatures. This concerned the consultant regarding use of extrapolation of Galesville temperatures to Elk Creek.

Wildlife

ODFW, the County, and BR met to discuss the draft wildlife mitigation plan. At this meeting, the state ODFW office expressed its desire for using the Habitat Evaluation Procedure (HEP) and onsite mitigation. Due to the nature of the habitat at the reservoir site, the agencies agreed that a modified HEP was appropriate. A HEP team was formed, and the HEP field work was performed in the fall by FWS, ODFW, and Douglas County.

Cultural Resources

BR received Heritage Research Associates' draft final report on the Class I Survey.

1989

Public Involvement

Douglas County conducted 8 water advisory board meetings in 1989, and the Milltown Hill project was an agenda topic in each of them. One meeting was held in Drain on February 15. About 70 local residents attended and participated in a question and answer session on the project. The board held another meeting in Yoncalla on December 20. Topics at the meeting included the irrigated land base around Yoncalla and procedures for purchasing properties needed for the reservoir. Several residents in the reservoir area wanted to sell their property and wanted the process to move more rapidly.

The Business and Industry Section Joint Chambers of Commerce held a "Project Leadership" meeting on December 14. The Milltown Hill project was discussed for about 30 minutes.

Water Quality

BR and Douglas County decided that additional mercury analysis was needed to define the extent of possible contamination from the Elkhead Mine. A series of sites were selected for soil sampling and subsequent analysis of heavy metals. The U.S. Geological Survey laboratory in Denver, Colorado performed the analyses for BR.

Environmental Coordination

BR issued a Notice of Intent to prepare an Environmental Impact Statement on the Milltown Hill Project in January. The notice appeared in the Federal Register on February 2. The Oregon Department of Transportation and BLM responded to the notice and requested that they be kept informed on the project.

In the fall of 1989, BR and Douglas County provided FWS with information on the potential irrigated land base for the project.

Douglas County met in December with BLM Roseburg staff to discuss construction of a service road over BLM-controlled land.

Fisheries

In April, the County's consultant performed a habitat survey of the area above the proposed damsite. This survey was to help estimate probable fish losses from the project. The survey was completed and sent to the agencies for review. A second survey was performed in the summer to quantify fish use of the area above the damsite and a report was sent to the agencies. The agencies concurred in the analysis.

A decision was made in the summer to include tributary stream production in the fishery analysis, since providing additional instream flows would allow migrating fish access to the tributaries.

The County consultant provided the agencies with a final fishery evaluation in the fall. The agencies expressed concerns about summer temperatures in the lower portion of Elk Creek. Unless temperatures can be assured within limits that would protect the fish, providing flows and instream and riparian habitat improvements would not yield the full potential of the stream fishery.

Stream Temperatures

The fishery management agencies decided early in the year that temperatures should be modelled for the Milltown Hill project. Douglas County gathered field data for the modelling and BR performed modelling of both the reservoir and Elk Creek downstream from the dam. BR shared the results of the modelling with the FWS, ODFW, and the County in the late fall. While calibration of the reservoir model appeared reasonable, late season calibration of temperatures near the mouth of Elk

Creek were about 7 degrees Fahrenheit too high.

Wildlife

Analysis of the HEP field work was completed. A review of the HEP results indicated that the group wanted to move away from the sub-impoundment concept and that mitigating big game habitat on-site did not appear feasible. Mitigation through downstream riparian habitat improvement was discussed.

In the fall of 1989, BR suggested that the agencies needed to consider wildlife impacts likely from other project actions such as constructing the pipeline and irrigating land. These actions were not considered to have large impacts as the pipeline would be placed along existing road rights-of-way and the land base for irrigation is already harvested on a dry land basis.

Discussions continued between the ODFW state and regional offices on the desirability of off-site mitigation. Late in the year, Douglas county suggested the potential of securing Columbian white-tailed deer habitat in other parts of the county as mitigation for big game at the reservoir site. Due to the recovery plan, the white-tailed deer population continues to increase in other areas in Douglas County and has grown to such an extent that significant depredation problems are occurring. ODFW cannot manage the species due to its listing. Secured habitat is needed in order to de-list and manage the species.

Wetlands

BR and Douglas County met with staff from the Roseburg Office of the Soil Conservation Service (SCS). The SCS agreed that some project lands could potentially be classified as jurisdictional wetlands. SCS agreed to perform mapping of hydric soils in the potential irrigated area. BR made a formal request to the state SCS office requesting assistance in mapping the wetlands. Jurisdictional wetland classification involves a determination of hydric soils, present of potential growth of hydrophytic vegetation, and hydrology criteria. The SCS could not promise assistance beyond mapping hydric soils. The ODFW and FWS were included in discussions with the SCS on wetland mapping.

Realizing that formal mapping of jurisdictional wetlands in Douglas County was not scheduled until 1991 or possibly 1992, BR provided a botanist and biologist to check the hydric soil areas for possible inclusion as jurisdictional wetlands. BR and the FWS also agreed that the hydric soils areas should also receive a HEP in order to determine wildlife impacts.

Cultural Resources

BR awarded a contract to Heritage Research Associates, Inc. for a Class III Survey.

1990

Public Involvement

Douglas County invited State of Oregon environmental groups for a tour of and briefing on the potential project on February 26. The County mailed 36 invitations, but no one showed.

Other public involvement included a Douglas County presentation on the project to the annual meeting of the Douglas County Farmer's Cooperative on March 29. Between 125 and 150 county residents attended the meeting. In July, Douglas County contacted all residents living within the potential pipeline service area to provide a last chance to express their interest in receiving project water. This data was needed to confirm designs.

Environmental Coordination

Douglas County contacted BLM regarding road easements. The County wanted the easements to construct roads that it wanted to use as it continued investigations at the proposed dam site. BLM informed the County and BR that it considered the County proposed actions as project related, and it would not grant the easements until the EIS was finished and a decision document was issued by BR. BLM subsequently requested cooperating agency status on the Milltown Hill EIS. BR responded to BLM's request by describing the status report process that the County and BR were following.

BR had the FWS provide a draft and, later, a final copy of the Coordination Act Report (CAR) to BLM. The County continued coordination with BLM on access and developed an erosion control plan for the access area.

BR and County provided descriptive information needed by the FWS to prepare the CAR. The FWS provided BR with a draft CAR on May 22. An agency meeting was held in Portland, Oregon on

June 26 to discuss the CAR. Discussions at this meeting included the adequacy of the draft CAR with particular emphasis placed on detailing reservoir operations and instream flows, instream water temperatures, fishery monitoring plans, and wildlife mitigation. BR subsequently provided the FWS with maps of wetland and irrigated areas, land classification standard, and a project location map. BR received the final CAR on August 23.

BR produced a draft Status and Environmental Report of the project December 1. On December 12, Douglas County issued a Notice of Intent, to the Bureau of BR, to apply for federal financing of the Milltown Hill project under the Small BR Projects Act of 1956, as amended. Copies of the Notice of Intent were sent to FWS, EPA, Governor of Oregon, Oregon A-95 Clearinghouse (See: Appendix D), Water Resources Department, Department of Environment Quality, Department of Fish and Wildlife, Department of Forestry, Division of State Lands, Department of Parks and Recreation, Department of Transportation.

Threatened and Endangered Species

BR and the agencies agreed that the listing and biological assessment are out of date. BR will update these at the next stage of the study.

Fisheries

The agencies met to discuss the draft FWS Coordination Act Report (CAR) which included the fishery analysis. The group decided that additional temperature modeling was needed, as was a monitoring plan. The group agreed upon a summer data gathering and analysis program for the temperature modelling. The group also outlined an acceptable monitoring program.

Instream Flows

The FWS prepared its draft CAR which included instream flow data. ODFW and NMFS questioned that the project could deliver the stated instream flows. Douglas County provided revised operation studies that demonstrated the project's ability to provide the stated instream flows.

Stream Temperatures

BR and the County met with the FWS early in the winter. The County had contracted with an engineer to perform additional modelling. The new modelling was unable to resolve calibration problems in the lower river. Several reasons for the discrepancy were considered including marine air effects, river shading, and the predominance of large pools in the lower river.

Wildlife

The Columbian white-tailed deer recovery team met in January to consider the county's proposal to secure white-tailed deer habitat. Team members included representatives from ODFW, FWS, and the Washington Department of Wildlife. Secured habitat totalling 3,500 acres is required for de-listing and 671 acres of this could be credited to the Milltown Hill reservoir. Securing white-tailed deer habitat would also secure habitat for black-tailed deer and other species associated with riparian and oak woodlands.

A modified HEP was performed on lands that would be irrigated. The primary concern in this HEP involved seasonal wetlands.

Based on the HEP results and securing white-tailed deer habitat, ODFW, FWS, the County, and BR were able to prepare a detailed mitigation plan. The plan included mitigation for all potential project impacts to wildlife. All plan mitigation would be on-site with the exception of securing white-tailed deer habitat.

Wetlands

The HEP analysis evaluated adverse impacts on approximately 28 acres of wetlands. The County, BR, ODFW, and FWS determined that wetlands could be mitigated on-site. Mitigation would consist of improvements to an abandoned off-site log pond and development of wetlands in the upper end of the reservoir.

The mitigation plan does not mitigate for jurisdictional wetlands that may be identified at a future date. The project will include a sinking fund to pay for drainage of some irrigated lands, but any lands subsequently identified as jurisdictional wetlands will not receive project drainage. The wildlife evaluation did not consider any wetland drainage effects since drainage is for agricultural lands and not wetlands. No project drainage or change in agricultural practices would occur to negatively affect jurisdictional wetlands at the time the water service contract is negotiated. This would be enforced by County with a wetland protective clause in the water service contract between the County and individual water user.

Cultural Resources

Based on preliminary survey results, BR requested site numbers for 3 locations in the potential reservoir area from the State Historic Preservation Office in February. BR received Heritage Research Associates' draft final report on the Class III Survey.

Recreation

The Douglas County Parks Department gave the Douglas County Water Resources Survey a report presenting recreation concepts for the Milltown Hill dam and reservoir. The report included recreation uses, designated recreation areas, and possible development at each recreation site.

Prime and Unique Farmland

The Soil Conservation Service provided the Bureau of Reclamation information that there are no prime and unique farmlands in the project service area. The soils upstream of the damsite had not been classsified, so information on the presence of prime and unique farmlands for this area would not be available until 1991.

1991

Consultation and Coordination

On January 22, the Oregon State Clearinghouse sent Douglas County copies of State agencies' comments on the County's December 12, 1990 Notice of Intent. Comments were received from the following agencies: Department of Forestry, State Historic Preservation Office, Division of lands, Department of Fish and Wildlife, Water Resources Department. Comments from the above agencies will be addressed in the Environmental Report.

On January 28, a meeting was held in Roseburg, attended by Douglas County, BLM, and BR. The County advised BLM of its December 12, 1990 Notice of Intent to apply for federal financing of the project and gave an update on project design.

Threatened and Endangered Species

On February 28, BR requested a list of threatened and endangered (T&E) plant and animal species from FWS, and designated Campbell-Craven responsible for writing the Section

7 biological assessment.

On April 19, FWS furnished Campbell-Craven a list of T&E plant and animal species that may be present in the project area.

On April 28, Campbell-Craven initiated a survey of Northern spotted owls in the project area and vicinity.

On May 1, 1991, FWS published in the Federal Register a proposed determination of critical habitat of the Northern spotted owl. All lands in Township 23S., R.4W., Willamette Meridian, including all proposed "take lands" for the reservoir have been listed as critical habitat in the publication. Comments will be received until June 5, 1991. A revised initial habitat proposal will be published 60 days later. Public comments on the revised proposal will be received for 60 days.

On August 22, Campbell-Craven reported on the survey of the Northern spotted owl. No owls were sighted or heard within 1.2 miles of the proposed dam site.

On August 11, Campbell-Craven completed a Biological Assessment of the project, according to Sec. 7 of the Endangered Species Act of 1973. The Biological Assessment was sent to the Bureau of Reclamation for review.

On August 13, the Fish and Wildlife Service published in the Federal Register (Vol 56, No 156), a revised proposed rule of Critical Habitat for the Northern spotted owl. No federal, state, county or private lands within the project "take line" have been designated as critical habitat (Page 40070). There is a 60-day public comment period. The Fish and Wildlife Service will publish a final critical habitat rule within 60 days after close of the public comment period.

Prime and Unique Farmlands

The Soil Conservation Service, in compliance with the Farmland Protection Act, Public Law 97-98, conducted a soil survey upstream of the damsite. Subsequently, the Soil Conservation Service provided a list of soils. Based on the soil map, 115 acres of prime farmlands were identified, no unique farmlands were identified.

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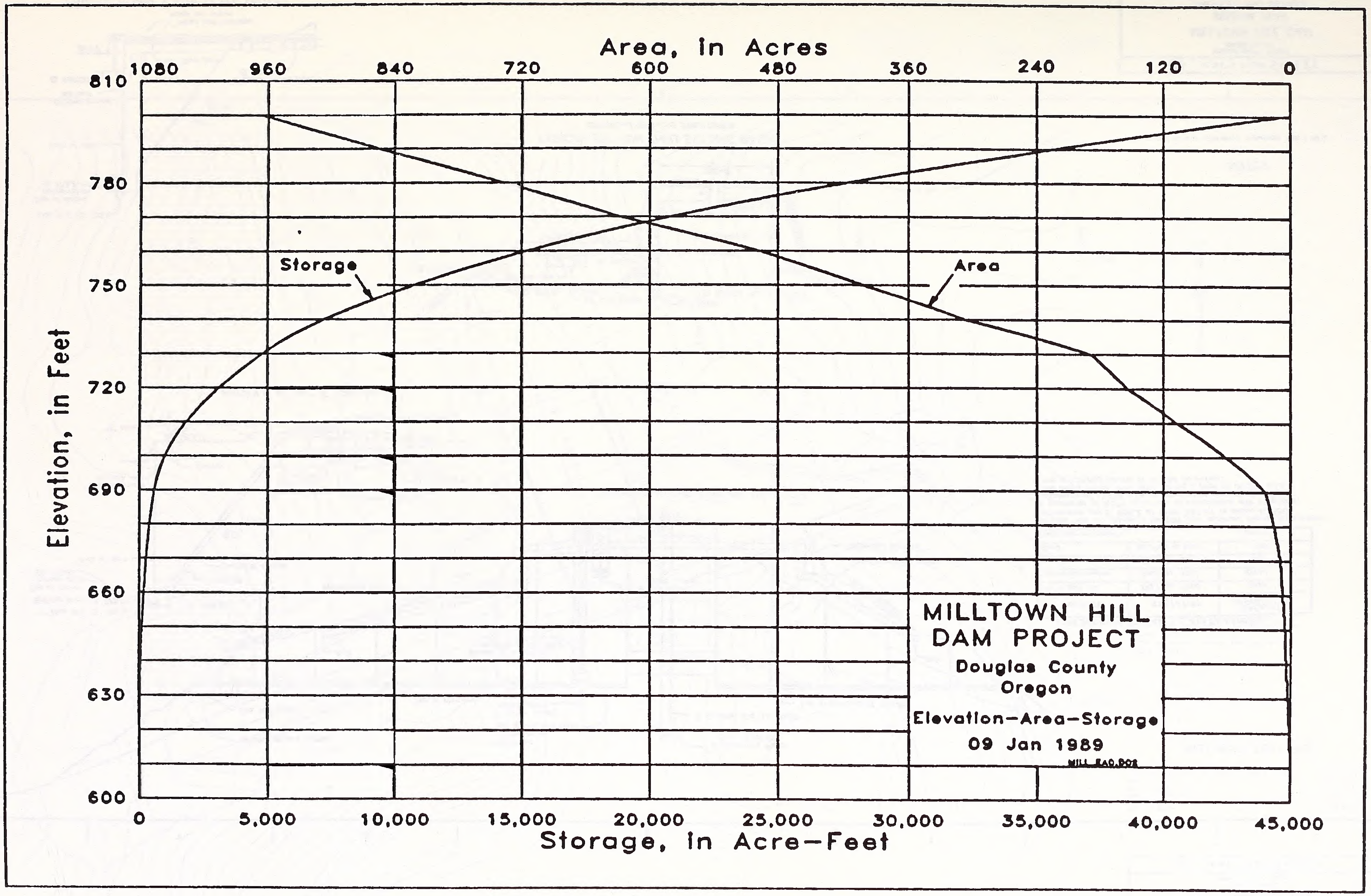
Appendix A

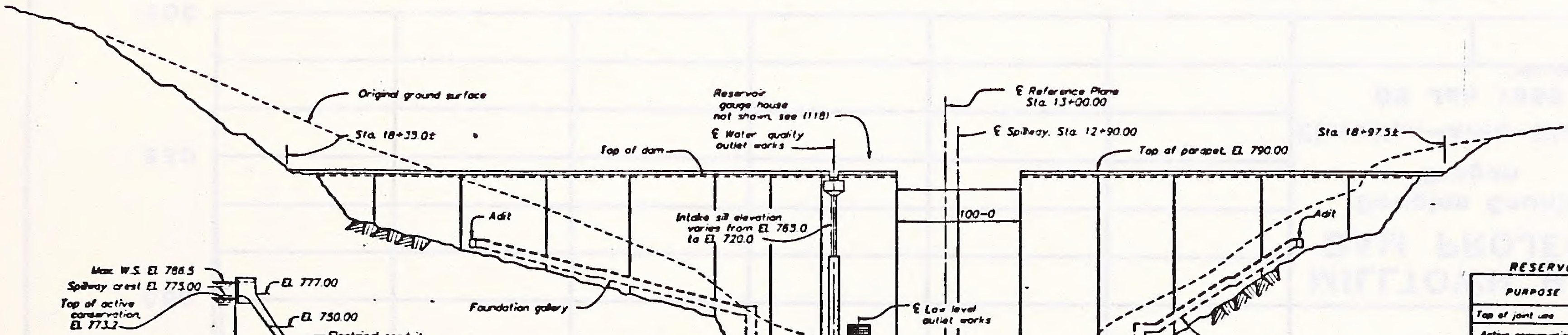
General Plan
Profiles and Details

Reservoir Area - Capacity Curve

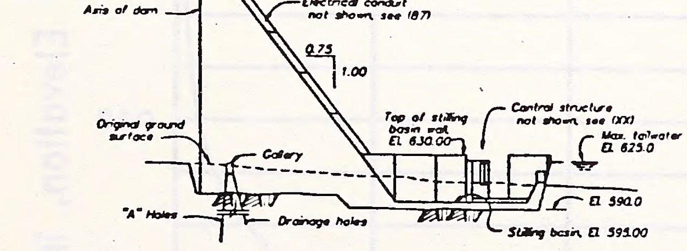


Milltown Hill reservoir storage capacity, and reservoir water surface area, versus reservoir pool.

Source: Milltown Hill Project, Hydrology Appendix. Chapter 5, page 196.


Original ground surface
Sta. 18+33.0±
Reservoir gauge house not shown, see (118)
℄ Water quality outlet works
Top of dam
Intake sill elevation varies from El. 765.0 to El. 720.0
℄ Reference Plane Sta. 13+00.00
℄ Spillway, Sta. 12+90.00
100-0
Top of parapet, El. 790.00
Sta. 18+97.5±
Adit
Foundation gallery
℄ Low level outlet works
Adit
Adit
Foundation gallery
Excavated surface

PROFILE ALONG AXIS OF DAM


Max. W.S. El. 786.5
Spillway crest El. 775.00
Top of active conservation, El. 773.2
Axis of dam
El. 777.00
El. 750.00
Electrical conduit not shown, see (87)
0.75
1.00
Original ground surface
Gallery
Top of stilling basin wall, El. 630.00
Control structure not shown, see (XX)
Max. tailwater El. 625.0
El. 590.0
"A" Holes
Drainage holes
Stilling basin, El. 595.00

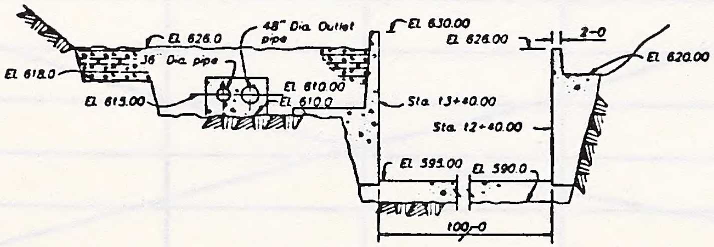
PROFILE ALONG ℄ SPILLWAY

RESERVOIR CAPACITY ALLOCATIONS

PURPOSE	ELEVATION	CAPACITY (ACRE-FEET)
Top of joint use	773.2 to 775.0	1200
Active conservation	686.3 to 773.2	22443
Inactive	650.0 to 686.3	393
Dead	Streambed to 650.0	107
Total reservoir capacity		24143

Includes 500 a.f. allowance for 100 year sediment deposition between streambed and El. 686.3, of which 393 a.f. is above El. 650.

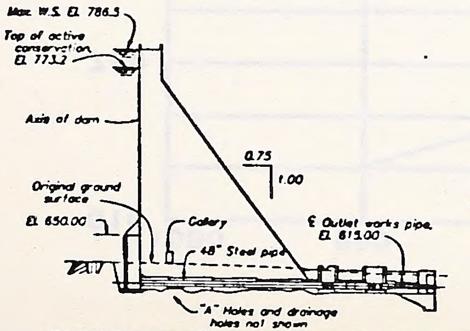
A surcharge of 8,374 acre-feet in combination with a spillway discharge of 15,235 c.f.s. is provided to protect against the inflow design flood (IDF), having a peak of 30,398 c.f.s. and a 7.5-day volume of 41,000 acre-feet.



TYPICAL SECTION THRU STILLING BASIN
(UPSTREAM OF VALVE STRUCTURES)

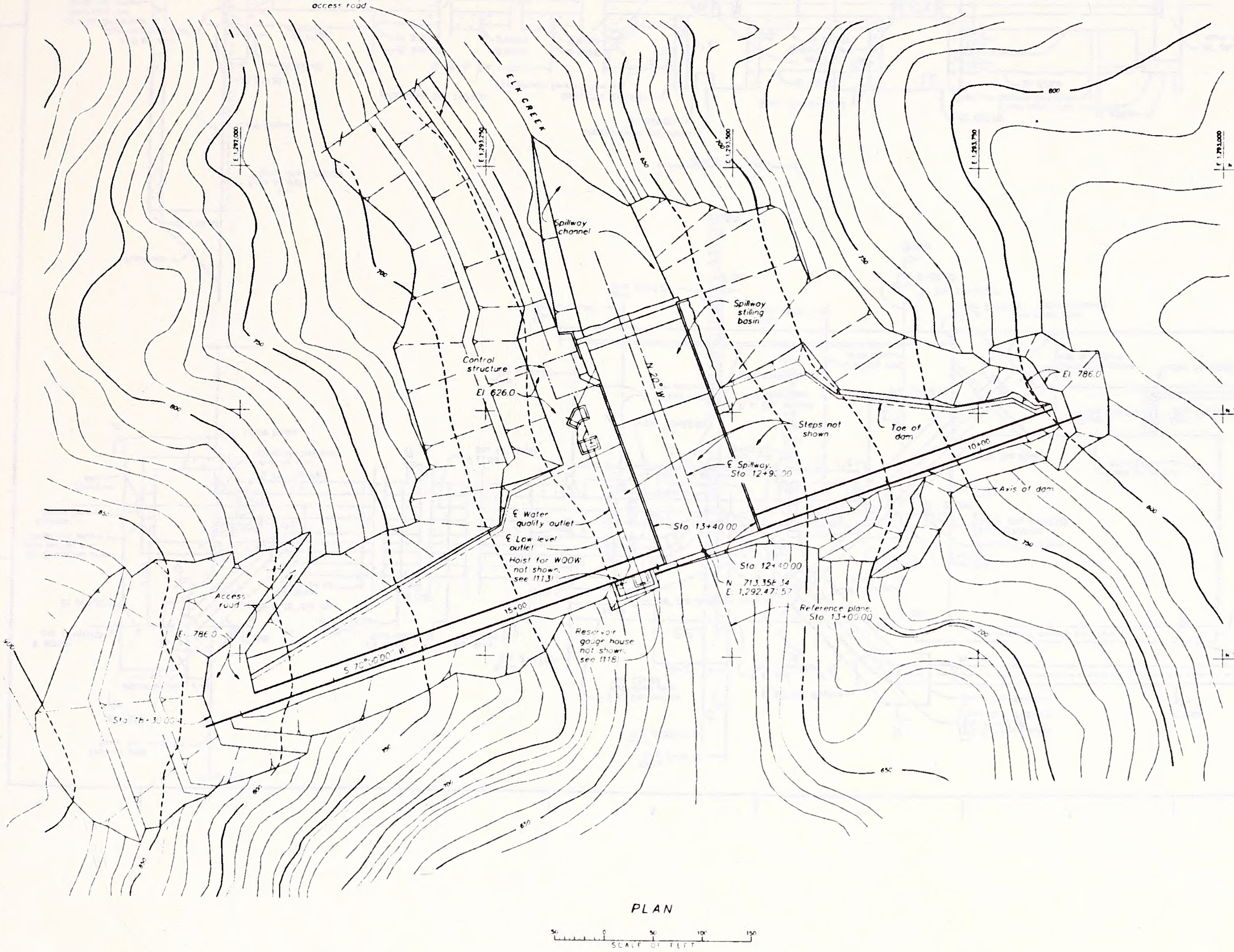
NOTES

For notes and reference drawings, see 1 10 L


Max. W.S. El. 786.5
Top of active conservation, El. 773.2
Axis of dam
0.75
1.00
Original ground surface
El. 650.00
Gallery
48" Steel pipe
℄ Outlet works pipe, El. 615.00
"A" Holes and drainage holes not shown

PROFILE ALONG ℄ LOW LEVEL OUTLET

ALWAYS THINK SAFETY
DOUGLAS COUNTY, OREGON
UMPQUA PROJECT
MILLTOWN HILL DAM
GENERAL PLAN
PROFILES AND DETAILS
UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
DESIGNED D.K. Smith TECHNICAL APPROVAL A.T. Richardson
DRAWN D.K. Smith SUBMITTED
CHECKED [illegible] APPROVED
[illegible]
DENVER, COLORADO [illegible] 1570-D-11



PLAN

NOTES

Spwy. is an abbreviation for Spillway.
WQOW is an abbreviation for Water Quality Outlet Works
LLOW is an abbreviation for Low Level Outlet Works

REFERENCE DRAWINGS

FOUNDATION EXCAVATION	1570-D-16
LEVELING CONCRETE, RCC, AND FACING ELEMENTS	1570-D-26
DAM JOINTS	1570-D-28
TOP OF DAM	1570-D-30
GALLERY AND ADITS	1570-D-36
SPILLWAY	1570-D-46
OUTLET WORKS	1570-D-57

ALWAYS THINK SAFETY

DOUGLAS COUNTY, OREGON
UMPQUA PROJECT

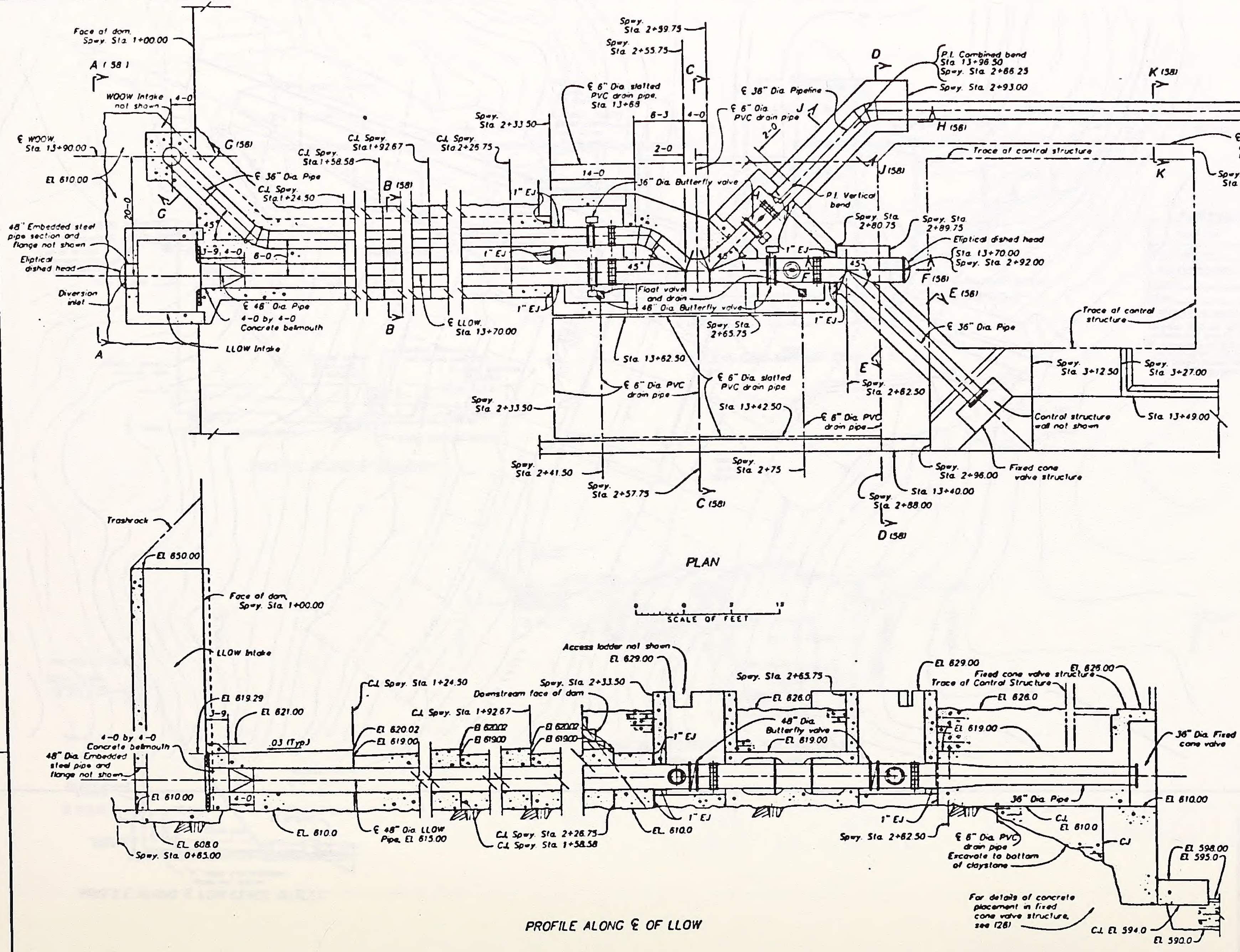
MILLTOWN HILL DAM
GENERAL PLAN
PROFILES AND DETAILS

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

DESIGNED D. H. SMITH TECHNICAL APPROVAL A. T. RICHARDSON
DRAWN D. H. SMITH SUBMITTED
CHECKED R. WOODY APPROVED
CHIEF, CIVIL ENGINEERING DIVISION

DENVER, COLORADO MAR. 07, 1991
SHEET 1 OF 2

1570-D-10



PLAN

PROFILE ALONG ℄ OF LLOW

NOTES

Compacted pervious backfill shall be placed where backfill is required, unless otherwise shown.
LLOW – Denotes Low Level Outlet Works.
WOOW – Denotes Water Quality Outlet Works.
For steel pipe details, see (103).
For WOOW Steel pipe, see (108).
For WOOW hoist details, see (117).
For WOOW trashrack details, see (131).
For LLOW trashrack details, see (128).
For embedded metalwork, see (104).
For miscellaneous metalwork, see (113).
For bulkhead gate, see (122).
For cable trench, see (133).
For control structure, see (1-S-01).
For ladders, see (115).

REFERENCE DRAWINGS

GENERAL PLAN	1570-D-10
LLOW INTAKE – ELEVATION AND SECTIONS	1570-D-60
WOOW INTAKE – ELEVATION AND SECTIONS	1570-D-61
VALVE STRUCTURES	1570-D-62
FIXED CONE VALVE STRUCTURE	1570-D-64

ALWAYS THINK SAFETY

DOUGLAS COUNTY, OREGON
UMPQUA PROJECT
MILLTOWN HILL DAM
OUTLET WORKS
PLAN, PROFILES, AND SECTIONS
UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

DESIGNED [illegible] TECHNICAL APPROVAL
DRAWN [illegible] SUBMITTED
CHECKED [illegible] APPROVED
DENVER, COLORADO [illegible] SHEET 1 OF 2
1570-D-57

Appendix B

Environmental Commitments

ENVIRONMENTAL COMMITMENTS

Douglas County, Oregon proposes to construct and operate the Milltown Hill Project on Elk Creek, Umpqua River, Oregon. The agency consultation and public involvement process has identified various opportunities to maintain or enhance the environment. County has considered the opportunities and includes the following as environmental commitments that will be implemented with the project.

A. Pre-Construction Phase

1. Permits and Approvals

- Douglas County or its contractors will obtain all necessary permits and approvals prior to construction.

2. Mineral and Aggregate Resources

- Obtain Permits, if needed, for Otten Quarry.

3. Geology, Soils, and Seismicity

- Perform investigations and evaluations of possible landslide areas within the reservoir basin which could be affected by road construction, borrow operations, or inundation.

- Perform investigations and evaluations to verify the adequacy of the foundation and abutments.

- Design the dam and appurtenant structures for the appropriate seismic values for the area.

4. Dam Safety

- Design the dam and related facilities in accordance with sound engineering practices.

- Submit construction plans and specifications to the Bureau of Reclamation and the Oregon Water Resources Department for safety review as well as to an independent review board.
- Develop an emergency action plan.

5. Surface Water

- Design the discharge facilities to provide aeration of flows.

6. Cultural Resources

- Historic structures evaluation and test excavations will be completed prior to project construction to determine if they are eligible to the Natural Register; means to avoid or reduce the adverse project effect will be investigated, and the adverse effect will be mitigated through data recovery. SHPO and the Advisory council on Historic Preservation will be consulted for review and approval. A Memorandum of Agreement (MOA) for impact mitigation actions will be signed by Reclamation, Douglas County, the SHPO, and the Council.

7. Social Environment

- Begin negotiations with property owners at the earliest possible date to minimize speculation, apprehension, and misinformation.

- Purchase private property and provide relocation assistance in accordance with the Uniform Relocation assistance and Real Property Acquisition Policies Act.

8. Wildlife

- If the western pond turtle is proposed for listing, or listed prior to construction, consultation with the Fish and Wildlife Service would be reinitiated. Following construction, populations of western pond turtle would be monitored and measures taken to insure the conservation of the species in Elk Creek in coordination with ODFW and the Fish and Wildlife Service.

9. Vegetation

- A survey would be conducted within any affected potential habitat for rough allocarya in the inundation area. If the species is found to occur in the inundation zone, consultation will be reinitiated with the Fish and Wildlife Service to determine requirements.

10. Fisheries Resource

- If the Umpqua chub is proposed for listing, or listed prior to construction, consulatation with the Fish and Wildlife Service would be reinitiated. Following construction, downstream populations of Umpqua chub would be monitored and measures be taken to insure the conservation of the species in Elk Creek in coordination with ODFW and the Fish and Wildlife Service.

B. Construction Phase

1. Topography

- Slope cuts and fills will be at angles that minimize potential for landslides; revegetate where appropriate to minimize erosion.

2. Mineral and Aggregate Resources

- Utilize excavated materials found within the impoundment perimeter for construction purposes if suitable.

3. Dam Safety

- Install 24-hour electronic sensors directly linked to Douglas County Reservoir Operations Center.

- Install appropriate instrumentation systems to allow monitoring of structure performance.

4. Air Quality

- Control dust during construction by wetting the ground surface as necessary.

- Revegetate exposed areas to achieve long-term soil stabilization.

- Minimize hauling distances by using fill material from within the pool area to avoid exposing downstream residences to wind blown dust.

- Use methods and devices as are reasonable available to control, prevent, and otherwise minimize atmospheric emissions or discharges of atmospheric contaminants and noise.

5. Surface Water

- Cut and remove vegetation from the impoundment to minimize decaying organics, except for Walker Creek which will not be disturbed. The area in the upper impoundment will be cleared under the direction of ODFW to leave trees/snags for wildlife.

- Avoid grubbing vegetation and soil disturbance in the reservoir area to the extent possible, to minimize nutrient release from soils.

- Install a multilevel water intake structure in the dam to help regulate temperature in the water released to Elk Creek.

- The project will comply with Executive Order 11988, Flood-plain Management.

- Reasonable care will be taken during construction of cofferdams or diversion dams to prevent increased turbidity or siltation in Elk Creek.

- To the extent possible, machinery for instream construction will operate from the streambank, not in the stream.

- To the extent possible, disturbance of the streambed will be kept to a minimum, and the streambed will be returned as nearly as possible to its original condition or better outside the reservoir.

- Excavated materials will not be stockpiled or deposited near or on streambanks, steep slopes, wetlands, or other watercourse perimeters where they could be washed away by high water or storm runoff or encroach upon the watercourse itself.

- Contractors will be required to use such methods and devices as are reasonably available to ensure that any waste waters discharged into surface waters will be essentially free of settleable material.

- Contractors will be required to comply with all State and Federal laws and regulations regarding the control and abatement of water pollution. The County has included a Clean Air and Water Certification in the Loan Application attesting that no facilities to be utilized in performance of the contract have been included on the EPA list of Violating Facilities.
- Any water quality monitoring required to assure that applicable State and Federal water quality standards are met during construction will be done by the contractor or Douglas County.
- The instream water right, (minimum perennial streamflow) will be maintained whenever sufficient natural flow is available in the stream.

6. Ground Water

- Sanitary wastes will be collected from the tanks of portable toilets and trucked to the nearest municipal wastewater treatment plant for disposal.

7. Vegetation

- Revegetate disturbed areas (either reseed or landscape) that are not permanently occupied by new facilities and those areas around new facilities, and at Otten Quarry.
- The project will comply with Executive Order 11990, Protection of Wetlands by preventing conversion of wetlands to agricultural use.
- Vegetation will be left undisturbed in Walker Creek area.

8. Wildlife

- Work with ODFW to develop the upper reservoir area for wildlife habitat.
- Excavate areas in upper pool area to create wetlands for wildlife habitat under the direction of ODFW.
- Block construction roads that will not be permanent access roads to minimize disturbance to wildlife.

- Enhance vegetation for nesting habitat on the island in the upper reservoir.

9. Fisheries Resources

- Install suitable facilities in the outlet system to aerate water releases.

- Minimize work in the stream that will cause turbidity or sedimentation or disturbance to spawning or rearing fish.

- Enhance spawning habitat in the lower reaches of Elk Creek by depositing gravel and by releasing cool water in the summer months.

10. Visual Quality

- Any long-term adverse impact on the aesthetic character of the project area will be minimized by proper landscaping, site design, or site restoration. When an area is no longer needed for construction, stockpiling, or access, any land disturbed but not permanently occupied by new facilities will be landscaped and/or revegetated as needed.

- Develop and maintain a vegetated buffer zone between the access road and reservoir and around the reservoir where possible.

- Provide landscaping or maintenance of vegetation at reservoir access areas.

- Shape the land where appropriate at the damsite and Otten Quarry and revegetate the area.

11. Property Lines

- Provide permanent reference survey markers for all land survey monuments to be inundated by the reservoir or destroyed by construction activities.

C. Operation Phase

1. Noise

- Restrict high-speed boating to the main pool by limiting access to the upper end of the reservoir.

- Restrict Walker Creek arm and upper reservoir to non-motorized boating.

2. Surface Water

- Elk Creek water temperature and instream flows will be monitored by the County throughout the life of the project. Data gathered will be used for project operations.

- Coordinate with the Oregon Department of Fish and Wildlife for optimum releases to benefit anadromous and resident fish.

- Operate the facility so existing minimum streamflows and prior water rights of record are not adversely affected.

- Flood control operations will be coordinated with the Corps of Engineers.

- Douglas County will coordinate with the Bureau of Land Management to review timber harvest activities near the reservoir.

3. Ground Water

- The contents of all existing septic tanks and cesspools which are in the reservoir pool area will be pumped and disposed of in wastewater treatment plants.

- Where required, drainage systems will be designed and constructed in those fields which would be irrigated, where natural ground water movement is at a rate unacceptable at the crop root zones.

4. Vegetation

- Maintain a vegetated buffer strip around Walker Creek area and around the impoundment. About 90 acres of timber will be left in Walker Creek arm and in the lower reservoir.

- Enhance riparian vegetation downstream of he damsite by establishing a local riparian vegetation habitat program. The County will promote, in cooperation with SCS and ODFW, maintenance of existing riparian vegetation.

- County will develop a wetlands enhancement program for the upper end of the reservoir. No project drainage or change in agricultural practices will occur to negatively affect jurisdictional wetlands at the time the water service contract is negotiated. This will be enforced by County with a wetland protective clause in the water service contract between the County and individual water user.

- County will acquire a 3-acre log storage pond near Yoncalla and will maintain and enhance the pond and surrounding area to provide a County park.
- Wetlands on irrigated service land will not be converted to agricultural use. No project drainage or change in agricultural practices will occur to negatively affect jurisdictional wetlands at the time the water service contract is negotiated. This will be enforced by County with a wetland protective clause in the water service contract between the County and individual water user.

5. Fisheries

- The Oregon Department of Fish and Wildlife will plant trout or warm-water fish in the reservoir.
- Debris piles will be left in the main pool area for fisheries enhancement.
- Placement and development of about 45,000 square feet of spawning gravels and associated habitat structures will be accomplished at a total of 8 areas between the damsite and the mouth of Elk Creek.
- The locations for habitat improvements further downstream in the mainstem of Elk Creek will be based on monitoring of physical conditions that develop during operation.
- Supplementation of juvenile anadromous fish will be initiated prior to project construction and will continue through the years of project operation to build the run size.
- A detailed monitoring and evaluation plan will be developed and implemented to track fishery accomplishments with the project, and serve as the basis to "fine-tune" project operations to achieve the optimum fishery benefits. Development of the plan will be coordinated with the fishery agencies.
- County will utilize up to 7,737 acre-feet of storage capacity for release to enhance anadromous and resident fisheries habitat below the damsite.

Instantaneous release of this water will be maintained at a level sufficient to enhance fisheries as directed by ODFW.

- County will develop a plan to maintain and enhance riparian habitat between the dam and Elkton.
- County will maintain sufficient gaging and thermograph stations to insure that target temperature and flow are met.

6. Wildlife

- County will secure 767 acres of area suitable for Columbian white-tailed deer.
- About 90 acres of standing timber will be left in the Walker Creek Arm and the lower reservoir; about 120 acres of standing timber will be left in the upper end of the pool.
- Shallow, permanent water bodies will be created in the upper end of the pool (upstream of the road crossing). About 23 acres of wetlands will be created in association with these pools which will retain water and support emergent vegetation upon lowering of the reservoir surface to elevation 740 feet msl.
- In addition to about 120 acres in the pool on the upper end of the reservoir, about 204 acres of land above the takeline will be managed for wildlife. This land will be acquired by direct purchase or conservation easements on deeds. A variety of habitat improvements will be realized on this land including fencing, grazing restrictions, planting wildlife cover and forage crops, nesting structures, and development of snags. During advance planning, an interagency team of biologists will develop a management plan for this area.
- Riparian enhancement will be conducted on about 1.5 miles of Elk Creek downstream of the project site. Restoration will include plantings and/or fencing in areas where vegetation has been impacted by grazing, brush clearing, and other human activities.

7. Recreation

- County will provide a part-time caretaker to help minimize trespassing and vandalism.

- Facilities will be operated by Douglas County Parks Department as part of its normal program.

8. Transportation

- Roads will be constructed and upgraded for access to the reservoir.

9. Police Protection

- Increased summer patrols will be implemented by the County Sheriff's Department in the project area to minimize vandalism and trespassing.

10. Visual Resources

- Douglas County will coordinate with the Bureau of Land Management to determine if modification of timber harvest activities would be necessary to maintain visual quality of the area near the reservoir.

Appendix C

Bureau of Reclamation Comments to Recommendations made by Fish and Wildlife Service in Review of the Status Report and Environmental Analysis

FISH AND WILDLIFE SERVICE
COORDINATION ACT REPORT

RECOMMENDATIONS

Under authority of the Fish and Wildlife Coordination Act (FWCA), P.L. 85-624 Section 2, and in accordance with Reclamation Planning Instructions, coordination with the Service was initiated at the inception of this study. The Service submitted a Final FWCA Report in August 1990. The impact analysis and mitigation plan presented in the Status Report and Environmental Analysis was developed in close cooperation with the Service and incorporates the recommendations of the FWCA Report. The FWS made 7 specific recommendations at the conclusion of its FWCA Report. These recommendations are noted below along with Reclamation's response to each recommendation.

RECOMMENDATIONS	RESPONSE
1. Additional temperature and flow data collection and analysis be completed to verify temperature modeling efforts with the project, and to be used in the operational plan. This work would be coordinated with fishery agencies.	1. Reclamation concurs with this recommendation. County will initiate additional studies in 1990 to evaluate water temperatures.
2. An operational plan should be completed to document flows with and without the project, and to clarify hydropower operations and its consistency with other project purposes.	2. Reclamation concurs with this recommendation. County will prepare operational plans. The operational plan would receive input from the Service, National Marine Fisheries Service, and Oregon Department of Fish and Wildlife.
3. A detailed monitoring and evaluation plan be developed and implemented to track fishery accomplishments with the project, and serve as the basis to fine-tune project operations to achieve the optimum fishery benefits. Development of the plan should be coordinated with the fishery agencies.	3. Reclamation concurs with this recommendation. County will develop and implement the plan after consultation with the fishery agencies. The plan will be implemented during project construction.

4. Implementation of the aquatic habitat improvements be developed in sequence, based on the results of the monitoring and evaluation work; and the need for possible fish passage improvements at the "Cunningham Dam" be evaluated."	4. Reclamation concurs with this recommendation. A plan will be developed by County to evaluate passage at Cunningham Dam during project construction.
5. In addition to the tree retention and wetlands development planned with the project, on-site wildlife mitigation measures be implemented, to include; land acquisition (204) acres; vegetation plantings; snag developments; and nest boxes and nest platforms. Additional details, design considerations, locations, etc. should be developed and coordinated with the resource agencies prior to project construction.	5. Reclamation concurs with is recommendation. The upper end of the reservoir could be developed and managed for a variety of wildlife species. All non-compatible uses should be restricted. Land could be acquired through purchase or secured by conservation easements. The interagency HEP team has evaluated a variety of features such as ponds, plantings, in-reservoir cover, etc. Specific plans for the wildlife area would be developed during advanced planning and coordinated with Oregon Department of Fish and Wildlife, the U. S. Fish and Wildlife Service, and Roseburg County Water Resources Department.
6. Off-site wildlife mitigation be implemented for Columbian white-tailed deer by securing 767 acres of suitable habitat within the core area for the deer. Addition securing of white-tailed deer habitat should be pursued as an enhancement opportunity toward delisting of the species.	6. Reclamation concurs with this recommendation. Douglas County and Oregon Department of Fish and Wildlife could coordinate efforts and contact land owners in the core area of Columbian white-tailed deer habitat. Agreements should be made to maintain the necessary habitat components such as understory vegetation.

7. Additional enhancement opportunities for fish and wildlife resources be implemented off-site by improving wetlands and/or riparian habitat in the Scotts and Yoncalla Valley areas. Details of this plan should be coordinated with the resource agencies prior to implementation.	7. Reclamation concurs in principle with this recommendation. Opportunities of riparian enhancement exist downstream along Elk Creek in Scott's Valley. Two logging ponds in the area have potential for wetland development. Both riparian restoration and wetland development would add to the general wildlife habitat values. A plan will be developed by County during project construction.

Appendix D

Notice of Intent and Oregon A-95 Clearing House Responses

STATE OF OREGON
1859
NEIL GOLDSCHMIDT
GOVERNOR

Water Resources Department

3850 PORTLAND ROAD NE, SALEM, OREGON 97310 PHONE 378-3671

I. R. D.
JAN 22 1991

MEMORANDUM

TO: State Clearinghouse, IRD

FROM: Rick Bastasch, Resource Management Division

DATE: January 17, 1991

SUBJECT: OR 901214-041-2:Milltown Hill Project on Elk Creek

The proposed project appears to be consistent with Water Resources Commission findings in the Umpqua River Basin Program. The findings document insufficient water supplies in all streams in the Elk Creek subbasin during low-flow periods. The program also notes insufficient streamflows to supply future municipal, industrial, and agricultural needs. In many of the subbasin's streams, storage of winter flows is described as necessary to provide adequate late season streamflows for anadromous fish. Lastly, the program states that "full utilization of the water resource potential in the ... Elk Subbasin will be obtained only through storage of surplus winter flows."

The Water Resources Department looks forward to reviewing more specific information provided in environmental assessments and through the water right application process.

cc: District 15
Watermaster

DOUGLAS COUNTY

PUBLIC WORKS DEPARTMENT

Administration
Room 219 / Courthouse
Roseburg, Oregon 97470
(503) 440-4208

Engineering and Construction
Room 304 / Courthouse
Roseburg, Oregon 97470
(503) 440-4481

Operations and Maintenance
2586 N.E. Diamond Lake Blvd
Roseburg, Oregon 97470
(503) 440-4268

Water Resources Survey
Room 103 / Justice Building
Roseburg, Oregon 97470
(503) 440-4255

January 14, 1991

State Clearinghouse
Intergovernmental Relations Division
155 Cottage Street NE
Salem, Oregon 97310

RE: Milltown Hill Dam
Project No. OR901214-041-2

Dear Sir/Madam:

On December 20, 1990, a notice of continuing interest was sent to Douglas County with additional questions from the Department of Environmental Quality (DEQ) concerning the above referenced project. The DEQ requested additional information on water quality issues.

The County agrees that additional information should be provided to the Department prior to their final comments on the project. The County would prefer to address those comments in more detail in the Draft Environmental Impact Statement (DEIS) we are currently preparing.

This project has been under study for the past two years and considerable data has been accumulated. The Bureau of Reclamation had intended to produce a DEIS, however, when the County elected to proceed with the project under the Small Reclamation's Act of 1956 the DEIS will be produced by the County.

While local scoping for the document has been done through a series of public meetings on the project, the County intends to have a formal coordination meeting in Portland with all the State Agencies during the month of February.

After the coordination meeting, the County will provide the DEQ with the water quality data to date for their input prior to printing the DEIS. In addition, the County will be requesting the DEQ for a "clean water certification" prior to proceeding with the project construction.

If this is not satisfactory or if there are additional questions, please contact me.

Yours truly,

M. John Youngquist

M. John Youngquist
Water Resources Coordinator

Oregon

DEPARTMENT OF
ENVIRONMENTAL
QUALITY

RECEIVED

FEB 14 1991

DOUGLAS COUNTY
PUBLIC WORKS ADMINISTRATION

REVIEWED:

Doug: __________
Doris: __________
Joyce: __________

February 8, 1991

County Board of Commissioners
Douglas County
1036 S.E. Douglas
Roseburg, OR 97470

RECEIVED

FEB 12 1991

DOUGLAS COUNTY
BOARD OF COMMISSIONERS

Re: Milltown Hill Project

This is to acknowledge receipt of your Notice of Intent to apply for Federal financing under the Small Reclamation Projects Act for the Milltown Hill Project on Elk Creek.

The County has clearly indicated it recognizes the need to obtain a water quality standards compliance certification from the Department pursuant to Section 401 of the federal Water Pollution Control Act and the Oregon Administrative Rules (OAR 340-48). As you proceed to study and pursue financing of your project proposal, we wish to draw your attention to some specific information and documents.

An applicant for water quality certification of a new hydroelectric project must pay a minimum fee of $5000 to the Department at the time the application is filed. The fee pays for the expenses incurred by the Department and the Environmental Quality Commission related to review and decision on a certification request. See Oregon Revised Statute (ORS) 468.065 (3) and 468.732 which are enclosed for additional information.

Also enclosed are materials explaining the 401 certification process and requirements, including:

1. OAR Chapter 340, Division 48.
2. ORS 468.065 (3) and ORS 468.732
3. A "Format for Evaluation Report and Findings on the Application for Certification Pursuant to Section 401 of the Federal Clean Water Act", DEQ April, 1989.

811 SW Sixth Avenue
Portland, OR 97204-1390
(503) 229-5696

The DEQ April 1989 document describes the type of information the Department will look for and how the application will be evaluated. The application need not follow the exact format of the document, however.

If you have any questions or would like additional information, please contact me at 229-6978.

Sincerely,

Mary M. Halliburton

Mary M. Halliburton
Standards and Assessments
Water Quality Division

MMH:crw
SA\WC7793
cc: Rick Bastasch, Oregon Water Resources Department

DIVISION 48

CERTIFICATION OF COMPLIANCE WITH WATER QUALITY REQUIREMENTS AND STANDARDS

Purpose

340-48-005 The purpose of these rules is to describe the procedures to be used by the Department of Environmental Quality for receiving and processing applications for certification of compliance with water quality requirements and standards for projects which are subject to federal agency permits or licenses and which may result in any discharge into navigable waters or impact water quality. In this certification process, the Department of Environmental Quality acts pursuant to Section 401 of the **Federal Clean Water Act.** The Department will also comply with state law to the extent that federal law does not supersede state law.

Stat. Auth.: ORS Ch. 468
Hist.: DEQ 18-1985, f. & ef. 12-3-85; DEQ 1-1987, f. & ef. 1-30-87

Definitions

340-48-010 As used in these rules unless otherwise required by context:

(1) "Certification" means a written declaration by the Department of Environmental Quality, signed by the Director, that a project or activity subject to federal permit or license requirements will not violate applicable water quality requirements or standards.

(2) "Clean Water Act" means the Federal Water Pollution Control Act of 1972, Public Law 92-500, as amended.

(3) "Coast Guard" means U.S. Coast Guard.

(4) "Commission" means Oregon Environmental Quality Commission.

(5) "Corps" means U.S. Army Corps of Engineers.

(6) "Department" or "DEQ" means Oregon Department of Environmental Quality.

(7) "Director" means Director of the Department of Environmental Quality or the Director's authorized representative.

(8) "Local Government" means county and city government.

Stat. Auth.: ORS Ch. 468
Hist.: DEQ 18-1985, f. & ef. 12-3-85

Certification Required

340-48-015 Any applicant for a federal license or permit to conduct any activity, including but not limited to the construction or operation of facilities which may result in any discharge to waters of the state, must provide the licensing or permitting agency a certification from the Department that any such activity will comply with Sections 301, 302, 303, 306, and 307 of the Clean Water Act which generally prescribe effluent limitations, water quality related effluent limitations, water quality standards and implementation plans, national standards of performance for new sources, and toxic and pretreatment effluent standards.

Stat. Auth.: ORS Ch. 468
Hist.: DEQ 18-1985, f. & ef. 12-3-85

Application for Certification

340-48-020 (1) Except as provided in section (6) below, completed applications for project certification shall be filed directly with the DEQ.

(2) A completed application filed with DEQ shall contain, at a minimum, the following information:

(a) Legal name and address of the project owner.

(b) Legal name and address of owner's designated official representative, if any.

(c) A description of the project location sufficient to locate and distinguish proposed project facilities.

(d) Names and addresses of immediately adjacent property owners.

(e) A complete description of the project proposal, using written discussion, maps, diagrams, and other necessary materials.

(f) Name of involved waterway, lake, or other water body.

(g) Copies of the environmental background information required by the federal permitting or licensing agency or such other environmental background information as may be necessary to demonstrate that the proposed project or activity will comply with water quality requirements.

(h) Copy of any public notice and supporting information, issued by the federal permitting or licensing agency for the project.

(i) An exhibit which:

(A) Identifies and cites the specific provisions of the appropriate local land use plan and implementing regulations that are applicable to the proposed project;

(B) Describes the relationship between the proposed project and each of the provisions identified in paragraph (A) of this section; and

(C) Discusses the potential direct and indirect relationship to water quality of each item described in paragraph (B) of this section.

(D) If specific land use compatibility findings have been prepared by the local planning jurisdiction, these findings should be submitted as part of this exhibit and may be substituted for the requirements in paragraphs (A) and (B) of this section.

(j) For hydroelectric projects, an exhibit which:

(A) Identifies and cites the applicable provisions of ORS 469.371 and 543.017 and implementing rules adopted by the Energy Facility Siting Council and Water Resources Commission;

(B) Describes the relationship between the proposed project and each of the provisions identified in paragraph (A) of this section; and

(C) Discusses the potential direct and indirect relationship to water quality each item described in paragraph (B) of this section.

(k) An exhibit which identifies and describes any other requirements of state law applicable to the proposed project which may have a direct or indirect relationship to water quality.

(3) The DEQ reserves the right to request any additional information necessary to complete an application or to assist the DEQ to adequately evaluate the project impacts on water quality. Failure to complete an application or provide any requested additional information within the time specified in the request shall be grounds for denial of certification.

appropriate requirements of state law according to Section 401 of the Federal Water Pollution Control Act, Public Law 92-500, as amended.

(h) A condition which requires the certificate holder to notify the Department of all changes in the project proposal subsequent to certification.

(3) If the applicant is dissatisfied with the conditions of any granted certification, the applicant may request a hearing before the Commission. Such requests for a hearing shall be made in writing to the Director within 20 days of the date of mailing of the certification. Any hearing shall be conducted pursuant to the rules of the Commission for contested cases.

(4) Certifications granted pursuant to these rules are valid for the applicant only and are not transferable.

Stat. Auth.: ORS Ch. 468
Hist.: DEQ 18-1985, f. & ef. 12-3-85; DEQ 1-1987, f. & ef. 1-30-87

Certification Delivery

340-48-030 For projects where application for certification is filed directly with DEQ by the applicant, the DEQ certification will be returned directly to the applicant. For those applications that are coordinated by the Division of State Lands, DEQ certification will be delivered to the Division of State Lands for distribution to the applicant and the federal permitting agencies as part of the Oregon coordinated response.

Stat. Auth.: ORS Ch. 468
Hist.: DEQ 18-1985, f. & ef. 12-3-85

Denial of Certification

340-48-035 If the Department proposes to deny certification for a project, a written notice setting forth the reasons for denial shall be served upon the applicant following procedures in OAR 340-11-097. The written notice shall advise the applicant of appeal rights and procedures. A copy shall also be provided to the federal permitting agency. The denial shall become effective 20 days from the date of mailing such notice unless within that time the applicant requests a hearing before the Commission or its authorized representative. Such a request for hearing shall be made in writing to the Director and shall state the grounds for the request. Any hearing held shall be conducted pursuant to the rules of the Commission for contested cases.

Stat. Auth.: ORS Ch. 468
Hist.: DEQ 18-1985, f. & ef. 12-3-85

Revocation or Suspension of Certification

340-48-040 (1) Certification granted pursuant to these rules may be suspended, or revoked if the Director determines that:

(a) The federal permit or license for the project is revoked.

(b) The federal permit or license allows modification of the project in a manner inconsistent with the certification.

(c) The application contained false information or otherwise misrepresented the project.

(d) Conditions regarding the project are or have changed since the application was filed.

(e) Special conditions or limitations of the certification are being violated.

(2) Written notice of intent to suspend or revoke shall be served upon the applicant following procedures in OAR 340-11-097. The suspension or revocation shall become effective 20 days from the date of mailing such notice unless within that time the applicant requests a hearing before the Commission or its authorized representative. Such a request for hearing shall be filed with the Director and shall state the grounds for the request. Any hearing held shall be conducted pursuant to the rules of the Commission for contested cases.

Stat. Auth.: ORS Ch. 468
Hist.: DEQ 18-1985, f. & ef. 12-3-85

so provided, as may be fixed by the director, and shall be reimbursed for all expenses actually and necessarily incurred by the deputy director in the performance of the official duties of the deputy director. [1973 c.291 §2]

Note: 468.050 was enacted into law by the Legislative Assembly but was not added to or made a part of ORS chapter 468 or any series therein by legislative action. See Preface to Oregon Revised Statutes for further explanation.

468.055 Contracts with Health Division. In addition to the authority granted under ORS 190.003 to 190.110, when authorized by the commission and the Health Division, the director and the Assistant Director for Health may contract on behalf of their respective agencies for the purposes of carrying out the functions of either agency, defining areas of responsibility, furnishing services or employees by one to the other and generally providing cooperative action in the interests of public health and the quality of the environment in Oregon. Each contracting agency is directed to maintain liaison with the other and to cooperate with the other in all matters of joint concern or interest. [Formerly 449.062]

468.060 Enforcement of rules by health agencies. On its own motion after public hearing, the commission may grant specific authorization to the Health Division or to any county, district or city board of health to enforce any rule of the commission relating to air or water pollution or solid wastes. [Formerly 449.064]

468.065 Issuance of permits; content; fees; use. Subject to any specific requirements imposed by ORS 448.305, 454.010 to 454.040, 454.205 to 454.255, 454.405, 454.425, 454.505 to 454.535, 454.605 to 454.745 and this chapter:

(1) Applications for all permits authorized or required by ORS 448.305, 454.010 to 454.040, 454.205 to 454.255, 454.405, 454.425, 454.505 to 454.535, 454.605 to 454.745 and this chapter shall be made in a form prescribed by the department. Any permit issued by the department shall specify its duration, and the conditions for compliance with the rules and standards, if any, adopted by the commission pursuant to ORS 448.305, 454.010 to 454.040, 454.205 to 454.255, 454.405, 454.425, 454.505 to 454.535, 454.605 to 454.745 and this chapter.

(2) By rule and after hearing, the commission may establish a schedule of fees for permits issued pursuant to ORS 468.310, 468.315, 468.555 and 468.740. The fees contained in the schedule shall be based upon the anticipated cost of filing and investigating the application, of issuing or denying the requested permit, and of an inspection program to determine compliance or noncompliance with the permit. The fee shall accompany the application for the permit.

(3) An applicant for certification of a project under ORS 468.732 or 468.734 shall pay as a fee all expenses incurred by the commission and department related to the review and decision of the director and commission. These expenses may include legal expenses, expenses incurred in processing and evaluating the application, issuing or denying certification and expenses of commissioning an independent study by a contractor of any aspect of the proposed project. These expenses shall not include the costs incurred in defending a decision of either the director or the commission against appeals or legal challenges. Every applicant for certification shall submit to the department a fee at the same time as the application for certification is filed. The fee for a new project shall be $5,000, and the fee for an existing project needing relicense shall be $3,000. To the extent possible, the full cost of the investigation shall be paid from the application fee paid under this section. However, if the costs exceed the fee, the applicant shall pay any excess costs shown in an itemized statement prepared by the department. In no event shall the department incur expenses to be borne by the applicant in excess of 110 percent of the fee initially paid without prior notification to the applicant. In no event shall the total fee exceed $40,000 for a new project or $30,000 for an existing project needing relicense. If the costs are less than the initial fee paid, the excess shall be refunded to the applicant.

(4) The department may require the submission of plans, specifications and corrections and revisions thereto and such other reasonable information as it considers necessary to determine the eligibility of the applicant for the permit.

(5) The department may require periodic reports from persons who hold permits under ORS 448.305, 454.010 to 454.040, 454.205 to 454.225, 454.405, 454.425, 454.505 to 454.535, 454.605 to 454.745 and this chapter. The report shall be in a form prescribed by the department and shall contain such information as to the amount and nature or common description of the pollutant, contaminant or waste and such other information as the department may require.

(6) Any fee collected under this section shall be deposited in the State Treasury to the credit of an account of the department. Such fees are continuously appropriated to meet the administrative expenses of the program for which they are collected. The fees accompanying an application to a regional air pollution control authority pursuant to a permit program authorized by the commis-

hereby declared to be the public policy of the state:

(1) To conserve the waters of the state;

(2) To protect, maintain and improve the quality of the waters of the state for public water supplies, for the propagation of wildlife, fish and aquatic life and for domestic, agricultural, industrial, municipal, recreational and other legitimate beneficial uses;

(3) To provide that no waste be discharged into any waters of this state without first receiving the necessary treatment or other corrective action to protect the legitimate beneficial uses of such waters;

(4) To provide for the prevention, abatement and control of new or existing water pollution; and

(5) To cooperate with other agencies of the state, agencies of other states and the Federal Government in carrying out these objectives. [Formerly 449.077]

468.715 Prevention of pollution. (1) Pollution of any of the waters of the state is declared to be not a reasonable or natural use of such waters and to be contrary to the public policy of the State of Oregon, as set forth in ORS 468.710.

(2) In order to carry out the public policy set forth in ORS 468.710, the department shall take such action as is necessary for the prevention of new pollution and the abatement of existing pollution by:

(a) Fostering and encouraging the cooperation of the people, industry, cities and counties, in order to prevent, control and reduce pollution of the waters of the state; and

(b) Requiring the use of all available and reasonable methods necessary to achieve the purposes of ORS 468.710 and to conform to the standards of water quality and purity established under ORS 468.735. [Formerly 449.095]

468.720 Prohibited activities. (1) Except as provided in ORS 468.740, no person shall:

(a) Cause pollution of any waters of the state or place or cause to be placed any wastes in a location where such wastes are likely to escape or be carried into the waters of the state by any means.

(b) Discharge any wastes into the waters of the state if the discharge reduces the quality of such waters below the water quality standards established by rule for such waters by the commission.

(2) No person shall violate the conditions of any waste discharge permit issued under ORS 468.740.

(3) Violation of subsection (1) or (2) of this section is a public nuisance. [Formerly 449.079]

468.725 Effluent limitations. In relation to the waters of the state, the commission by rule may establish effluent limitations, as defined in Section 502 of the Federal Water Pollution Control Act, as amended by Public Law 92-500, October 18, 1972, and other minimum requirements for disposal of wastes, minimum requirements for operation and maintenance of disposal systems, and all other matters pertaining to standards of quality for the waters of the state. The commission may perform or cause to be performed any and all acts necessary to be performed by the state to implement within the jurisdiction of the state the provisions of the Federal Water Pollution Control Act of October 18, 1972, and Acts amendatory thereof or supplementary thereto, and federal regulations and guidelines issued pursuant thereto. [Formerly 449.081]

468.730 Implementation of Federal Water Pollution Control Act. The commission may perform or cause to be performed any and all acts necessary to be performed by the state to implement within the jurisdiction of the state the provisions of the Federal Water Pollution Control Act, enacted by Congress, October 18, 1972, and Acts amendatory thereof or supplementary thereto, and federal regulations and guidelines issued pursuant thereto. The commission may adopt, modify or repeal rules, pursuant to ORS 183.310 to 183.550, for the administration and implementation of this section. [1973 c.92 §3]

468.732 Certification of hydroelectric power project; comments of affected state agencies. The Director of the Department of Environmental Quality shall approve or deny certification of any federally licensed or permitted activity related to hydroelectric power development, under section 401 of the Federal Water Pollution Control Act, P.L. 92-500, as amended. In making a decision as to whether to approve or deny such certification, the director shall:

(1) Solicit and consider the comments of all affected state agencies relative to adverse impacts on water quality caused by the project, according to sections 301, 302, 303, 306 and 307 of the Federal Water Pollution Control Act, P.L. 92-500, as amended.

(2) Approve or deny a certification only after making findings that the approval or denial is consistent with:

(a) Rules adopted by the Environmental Quality Commission on water quality;

(b) Provisions of sections 301, 302, 303, 306 and 307 of the Federal Water Pollution Control Act, P.L. 92-500, as amended;

(c) Standards established in ORS 469.371 and 543.017 and rules adopted by the Water

Resources Commission and the Energy Facility Siting Council implementing such standards; and

(d) Standards of other state and local agencies that are consistent with the standards of ORS 469.371 and 543.017 and that the director determines are other appropriate requirements of state law according to section 401 of the Federal Water Pollution Control Act, P.L. 92-500, as amended. [1985 c.569 §7]

468.734 Certification of change to hydroelectric power project; notification of federal agency. Within 60 days after the Department of Environmental Quality receives notice that any federal agency is considering a permit or license application related to a change to a hydroelectric project or proposed hydroelectric project that was previously certified by the Director of the Department of Environmental Quality according to section 401 (1) of the Federal Water Pollution Control Act P.L. 92-500, as amended:

(1) The director shall:

(a) Solicit and consider the comments of all affected state agencies relative to adverse impacts on water quality caused by changes in the project, according to sections 301, 302, 303, 306 and 307 of the Federal Water Pollution Control Act, P.L. 92-500, as amended.

(b) Approve or deny a certification of the proposed change after making findings that the approval or denial is consistent with:

(A) Rules adopted by the Environmental Quality Commission on water quality;

(B) Provisions of sections 301, 302, 303, 306 and 307 of the Federal Water Pollution Control Act, P.L. 92-500, as amended;

(C) Standards established in ORS 469.371 and 543.017 and rules adopted by the Water Resources Commission and the Energy Facility Siting Council implementing such standards; and

(D) Standards of other state and local agencies that are consistent with the standards of ORS 469.371 and 543.017 and that the director determines are other appropriate requirements of state law according to section 401 of the Federal Water Pollution Control Act, P.L. 92-500, as amended.

(2) On the basis of the evaluation and determination under subsection (1) of this section, the director shall notify the appropriate federal agency that:

(a) The proposed change to the project is approved; or

(b) There is no longer reasonable assurance that the project as changed complies with the applicable provisions of the Federal Water Pollution Control Act, P.L. 92-500, as amended, because of changes in the proposed project since the director issued the construction license or permit certification. [1985 c.569 §8]

468.735 Standards of quality and purity; factors to be considered; meeting standards. (1) The commission by rule may establish standards of quality and purity for the waters of the state in accordance with the public policy set forth in ORS 468.710. In establishing such standards, the commission shall consider the following factors:

(a) The extent, if any, to which floating solids may be permitted in the water;

(b) The extent, if any, to which suspended solids, settleable solids, colloids or a combination of solids with other substances suspended in water may be permitted;

(c) The extent, if any, to which organisms of the coliform group, and other bacteriological organisms or virus may be permitted in the waters;

(d) The extent of the oxygen demand which may be permitted in the receiving waters;

(e) The minimum dissolved oxygen content of the waters that shall be maintained;

(f) The limits of other physical, chemical, biological or radiological properties that may be necessary for preserving the quality and purity of the waters of the state;

(g) The extent to which any substance must be excluded from the waters for the protection and preservation of public health; and

(h) The value of stability and the public's right to rely upon standards as adopted for a reasonable period of time to permit institutions, municipalities, commerce, industries and others to plan, schedule, finance and operate improvements in an orderly and practical manner.

(2) Standards established under this section shall be consistent with policies and programs for the use and control of water resources of the state adopted by the Water Resources Commission under ORS 536.220 to 536.540.

(3) Subject to the approval of the department, any person responsible for complying with the standards of water quality or purity established under this section shall determine the means, methods, processes, equipment and operation to meet the standards. [Formerly 449.086; 1985 c.673 §175]

468.740 When permit required. (1) Except as provided in ORS 468.689, without first obtaining a permit from the director, which permit shall specify applicable effluent limitations and shall not exceed five years in duration, no person shall:

Steve ✓
Bill ✓

VERNMENTAL PROJECT REVIEW

JAN 0 4 1991

e Clearinghouse
ental Relations Division
155 Cottage Street N. E.
Salem, Oregon 97310
373-7652

PLEASE RETURN ORIGINAL FORM

STATE AGENCY REVIEW

Project Number 0R901214-041-2 Return Date: JAN 18 1991

To Agency Addressed: If you intend to comment but cannot respond by the return date, please notify us immediately. If no response is received by the due date, it will be assumed that you have no comment and the file will be closed.

Douglas

PROGRAM REVIEW AND COMMENT

TO STATE CLEARINGHOUSE: We have reviewed the subject Notice and have reached the following conclusions on its relationship to our plans and programs:

[ ] It has no adverse effect.

[✓] We have no comment.

[ ] Effects, although measurable, would be acceptable.

[ ] It has adverse effects. (Explain in Remarks Section.)

[ ] We are interested but require more information to evaluate the proposal. (Explain in Remarks Section.)

[✓] Additional comments for project improvement. (Attach if necessary.)

====================

If the project would require the removal, fill, or alteration of 50 cubic yards or more of material within the banks of the waterway(s) or wetland area(s), we urge the applicant to apply for state removal or fill permits well in advance of construction deadlines to prevent unnecessary project delays. Specific information on the need for permits may be obtained from the Division of State Lands' office at 1600 State Street, Salem, OR 97310.

Thank you for the opportunity to comment on this project.

OF
NDS
'90

Agency Lands By

IPR #2 Phone Number 8305

RECEIVED
DEC 18 1990
WATER RESOURCES DEPT.
SALEM, OREGON

I. R. D.
JAN 24 1991

PLEASE RETURN ORIGINAL FORM

OREGON INTERGOVERNMENTAL PROJECT REVIEW

State Clearinghouse
Intergovernmental Relations Division
155 Cottage Street N. E.
Salem, Oregon 97310
373-7652

STATE AGENCY REVIEW

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☐ We are interested but require more information to evaluate the proposal. (Explain in Remarks Section.)

☑ Additional comments ~~for project improvement.~~ (Attach if necessary.)

REMARKS (Please type or print legibly)

See attached.

Agency Water Res By

IPR #2

Phone Number

RECEIVED
DEC 18 1990
STATE PARKS AND
RECREATION DEPARTMENT

I.R.D.
DEC 20 1990

OREGON INTERGOVERNMENTAL PROJECT REVIEW

State Clearinghouse
Intergovernmental Relations Division
155 Cottage Street N. E.
Salem, Oregon 97310
373-7652

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☐ Additional comments for project improvement. (Attach if necessary.)

REMARKS (Please type or print legibly)

The studies regarding cultural inventories and site evaluation in the 1988 BoR study by Heritage Research associates should be implemented

BoR
Milltown Hill Project
Elk Creek

Agency SHPO By

IPR #2

Phone Number

FOR FURTHER INFORMATION
PLEASE CONTACT LELAND
[illegible]
GILSEN 378-5023

DEC 18 1990

OREGON INTERGOVERNMENTAL PROJECT REVIEW

JAN 11 1991

State Clearinghouse
Intergovernmental Relations Division
155 Cottage Street N. E.
Salem, Oregon 97310
373-7652

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☐ Additional comments for project improvement. (Attach if necessary.)

REMARKS (Please type or print legibly)

The Department of Fish and Wildlife has been communicating directly with Douglas County and the Bureau of Reclamation regarding the Milltown Hill Project.

Agency F&W By Mary S. Potter

IPR #2 Phone Number 229-5410 x 464

I.R.D.

JAN 15 1991

Oregon

DEPARTMENT OF FORESTRY

State Foresters Office

"STEWARDSHIP IN FORESTRY"

January 14, 1991

State Clearinghouse
Intergovernmental Relations Division
155 Cottage St. N.E.
Salem, Oregon 97310

SUBJECT: COMMENTS IRD #OR901124-041-2
Douglas Countys' Milltown Hill Dam

Gentlemen:

We have received notice of the above and offer the following comments in regards to the proposed project.

This Department is responsible for fire protection on private forest lands in Oregon and all BLM lands in western Oregon. Prior to commencing operations on any forest land in Oregon, state laws require that contractors must notify the State Forester of that operation (ORS 527.670), obtain a permit to use power driven machinery (ORS 477.625) and if applicable; obtain a permit to clear rights-of-way (ORS 477.685).

The Oregon State Board of Forestry and this Department are concerned with reduction of the State's forest land base and associated losses of timber revenue, jobs, wages and other benefits. This loss of forest land base over the years has been due to many factors, including conversion of forest land to water impoundments.

Because of these concerns, we would like to see the following information provided in Douglas Countie's Draft Environmental Impact Statement for this project:

1. How many acres of productive forest land (by site class) will be affected by roads, transmission lines, buildings, penstocks, ditches or canals?
2. What values were used to arrive at estimated forest productivity losses for timber stumpage, wages, taxes, recreation, fish and wildlife?
3. Was the estimated value lost from forest productivity included in the economic analysis of the proposed project?

2600 State Street
Salem, OR 97310
(503) 378-2560

4. Are alternative rights-of-way or locations available for part or all of the project which do not involve forest land? If so, please give the reason for not selecting the alternative location.

The answers to these questions will be useful to us in making our analysis of the effect of this proposed project on the State's forest resources.

Please contact Bob Bourhill (phone 378-2553) if you need clarification.

Sincerely,

David H. Stere, Director
Forest Resource Planning

DHS/BB

ORIGINAL

BUREAU OF
RECLAMATION
OFFICIAL FILE COPY
JAN 28 1991

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OREGON INTERGOVERNMENTAL PROJECT REVIEW

State Clearinghouse
Intergovernmental Relations Division
155 Cottage Street N. E.
Salem, Oregon 97310
503)373-7652

CONCLUSIONS

APPLICANT: Douglas County

~~106 PH~~ 1/30
705 AH 1/30

PROJECT TITLE: Milltown Hill Dam on Elk Creek

DATE: January 22, 1991

The State of Oregon (and local clearinghouses if listed) has reviewed your project and reached the following conclusions:

☐ No significant conflict with the plans, policies or programs of state or local government have been identified.

☒ Relevant comments of state agencies and/or local governments are attached and should be considered in the final design of your proposal.

☐ Potential conflicts with the plans and programs of state and/or local government:

  ☐ may exist.

  ☐ have been identified and remain unresolved. The final proposal has been reviewed and final comments and recommendations are attached.

  ☐ have been satisfactorily resolved. No significant issues remain.

==================

A copy of this notification and attachments, if any, must accompany your application to the federal agency.

FEDERAL CATALOG # 15.503

NOTICE TO FEDERAL AGENCY
THE FOLLOWING IS THE OFFICIALLY ASSIGNED STATE IDENTIFIER NUMBER

OR901214-041-2

Dolores Streeter
Clearinghouse Coordinator

IPR #3
2139T

1859

JAN 1 9 1991

OREGON INTERGOVERNMENTAL PROJECT REVIEW

State Clearinghouse
Intergovernmental Relations Division
155 Cottage Street N. E.
Salem, Oregon 97310
373-7652

PLEASE RETURN ORIGINAL FORM

STATE AGENCY REVIEW

Project Number OR 901214-041-2 Return Date: ASAP (1-18-91)

To Agency Addressed: If you intend to comment but cannot respond by the return date, please notify us immediately. If no response is received by the due date, it will be assumed that you have no comment and the file will be closed.

Douglas

PROGRAM REVIEW AND COMMENT

TO STATE CLEARINGHOUSE: We have reviewed the subject Notice and have reached the following conclusions on its relationship to our plans and programs:

[ ] It has no adverse effect.

[ ] We have no comment.

[ ] Effects, although measurable, would be acceptable.

[ ] It has adverse effects. (Explain in Remarks Section.)

[x] We are interested but require more information to evaluate the proposal. (Explain in Remarks Section.)

[ ] Additional comments for project improvement. (Attach if necessary.)

===================

REMARKS (Please type or print legibly)

See attached letter. Douglas County's plan for providing the information we requested is satisfactory.

Agency Forestry By

IPR #2 Phone Number 378-5381

for preconstruction activities including the preparation of construction designs and specifications, to the extent that funds are available.

4. Approval of designs and specifications by the Bureau of Reclamation contingent on the designs and specifications being in accordance with sound engineering principles and being capable of accomplishing their purpose.

5. Upon approval of the designs and specifications, the Bureau of Reclamation will advance funds as required for construction of the project, to the extent of available funds.

We are sending a copy of this Notice of Intent to each of the agencies listed on the attached Distribution List.

BOARD OF COMMISSIONERS
OF DOUGLAS COUNTY, OREGON

By: Joyce Morgan
Chair

By: Doris L Wadsworth
Commissioner

By: Dan Robertson
Commissioner 12-12-90

Enclosures:
Project Location Map
Distribution List

Distribution List:

U.S. Fish and Wildlife Service
Portland, Oregon

Environmental Protection Agency
Seattle, Washington

Governor of Oregon
Salem, Oregon

State of Oregon
- A95 Clearinghouse
- Water Resources Department
- Department of Environmental Quality
- Department of Fish and Wildlife
- Department of Forestry
- Division of State Lands
- Department of Parks and Recreation
- Oregon Department of Transportation

4. The applicant has given due consideration under the Water Pollution Control Act and the Clean Air Act in the development of its plans for construction and operation, to the prevention or abatement of the pollution of streams, reservoirs, ground water or water courses, with respect to thermal or air pollution or the discharge of refuse, garbage, sewage effluent, industrial wastes, oil, mill tailings, mineral salts, or other water or air pollutants, and to opportunities for water quality control through storage or by other means. Also, consideration of Executive Orders 11988 and 11990, for Floodplain Management and Protection of Wetlands, respectively, is made. The applicant also must include a "Clean Air and Water Certification" and an Assurance of Compliance Form-Civil Rights Act with the application.

5. The estimate of the construction cost is satisfactory and adequate for determining the amount of the loan and/or grant.

6. The construction cost of the project has been allocated properly among the various purposes of the project.

7. The costs allocated to nonreimbursable purposes are justified Federal expenditures.

8. The applicant is or can reasonably become a suitable entity for contracting with the United States for repayment of the loan.

9. The applicant is willing and financially able to provide proper operation, maintenance, and replacement of its works including the proposed works, and to repay the loan within a period not to exceed 40 years from the date when the principal benefits of the project first become available.

L. The applicant understands that it will be required to finance from its own resources such portion of the project construction cost (which portion shall include the costs of acquiring necessary lands, land rights, and water rights) as the Secretary of the Interior shall determine to be proper.

M. The applicant understands that before a loan (or grant) can be approved, it must submit copies of the application (1) to the States of the drainage basin in which the project is located, for review in a like manner to that provided in Section (c) of the Flood Control Act of 1944; (2) to the Fish and Wildlife Service and to the fish and game organizations of the States affected by the project for review in accordance with provisions of the Fish and Wildlife Coordination Act; (3) to the Environmental Protection Agency in conformance with the provisions of the Federal Water Pollution Control Act; and (4) to the appropriate State contact point(s) in accordance with Title IV of the Intergovernmental Cooperation Act of 1968 and Section 204 of the Demonstration Cities and Metropolitan Development Act of 1966.

N. The applicant understands that the Governor of the State in which the project is located (or an appropriate State agency designated by him) must find the project to be financially feasible before a loan (or grant) can be approved.

O. The applicant understands that it will be required to prepare and submit an environmental assessment as a basis for preparation by Reclamation of necessary environmental reports.

P. The applicant understands that as a clearinghouse function, a copy of its application will be furnished for review and comment to the public agency charged with enforcing civil rights laws.

Q. The applicant understands that information covering the participation of minority groups and women on the board of commissioners, management staff, and among employees must be provided to the Regional Director. Such data will be used for "Pre-Award Review" by the Office for Equal Opportunity of the Department of the Interior to determine the status of compliance with title VI of the Civil Rights Act of 1964.

R. The applicant understands that:

1. It must pay in advance for all work performed by the Bureau of Reclamation, at the applicant's request, for use in the application.
2. All reimbursable costs, in excess of the $5,000 advanced by the applicant, incurred by the Bureau of Reclamation in processing the application and administering the proposed program will become a part of the loan.
3. Upon approval of the proposal, execution of the repayment contract, appropriation of funds by Congress, and release of these funds by the Office of Management and Budget, the Bureau of Reclamation will advance funds as required

The project also will include facilities for surface and subsurface drainage of irrigated lands, to be installed as determined necessary during development of irrigated lands.

The total cost of the project is estimated to be $37,800,000, with the County contributing $9,450,000.

F. The basic effect of the project on the environment would be to provide a firm water supply for the cities of Drain and Yoncalla and the community of Rice Hill for a projected 40 year period, enhance anadromous fish habitat through water quantity and quality improvements in Adams, Yoncalla and Elk Creeks, reduce flood damage in the city of Drain, and to provide a firm water supply for irrigation in Yoncalla and Scotts Valleys and in riparian areas along Elk Creek. Construction activities would be restricted to the minimum necessary for project purposes. The county will consult with all concerned agencies during the preconstruction period to assure the least possible adverse effects from the proposed project.

The County desires to prepare a draft environmental impact statement, therefore, we would appreciate the Bureau proceeding with a notice of intent in the Federal Register.

G. The applicant understands that the estimated total cost of the project cannot exceed the limitation imposed by section 2(f) of the Small Reclamation Projects Act of 1956 as amended, and that the limitation so established for calendar year 1990 is $46,600,000. The applicant further understands that the maximum amount of a loan, or combination of loan and grant, which can be obtained for a small reclamation project cannot exceed the limitation imposed by section 5(a) of the Small Reclamation Projects Act as amended. The limitation as established for calendar year 1990 is $31,100,000, and any cost in excess of the maximum permissible loan amount must be obtained from sources other than the loan or grant. The applicant hereby certifies that, to its best knowledge, the total project costs will not exceed the authorized ceiling.

H. The applicant understands that to obtain a loan, it must enter into a contract with the United States for repayment of the loan within 40 years or less from the date when the principal benefits of the project first become available.

The applicant understands further that interest will not be charged on that portion of the project cost which is properly assigned to irrigation or drainage of land not in excess of 160 acres in a single ownership. The applicant also understands that the amount of the loan allocated to irrigating or draining excess lands, municipal and industrial water, commercial power, and the reimbursable portion of costs allocated to fish and wildlife enhancement and outdoor recreation will be interest bearing.

I. The applicant understands that preparation of its application is to be financed with its own funds, and the application is to be in the form of a resolution by the Board of Commissioners accompanied by a report giving information on:

   1. History, organization, operation, and financial condition of the applicant.

   2. Lands to be served by the proposed project, crops produced on the lands, and types of agricultural enterprise.

   3, Water rights and existing and potential water supplies and their quality.

   4. Requirements for water for irrigation and, if applicable, for municipal, industrial, and domestic uses including the basis for projection of future use.

   5. The proposed project including descriptions of the various works; explanations of project operation; estimates of construction, operation, maintenance, and replacement costs; and appropriate maps and drawings.

   6. Benefits attributable to purposes involving grants, allocation of costs between purposes, and the ability of the applicant to repay the loan.

J. The applicant is willing and able to pay $5,000, at the time of its application, to cover part of the cost incurred by the Bureau of Reclamation in reviewing and processing the application.

K. The applicant understands that approval of the loan (or grant) will be dependent, among other things, on a satisfactory showing in the application that:

   1. The proposed project will serve its intended purpose.

   2. The plans are in accordance with sound engineering principles.

   3. The applicant has or can acquire all lands, and land and water rights required for satisfactory construction, operation, and maintenance of the project.

1990 DEC 13 AM 9:24

GAY FIELDS
DOUGLAS COUNTY CLERK

NOTICE OF INTENT
SMALL RECLAMATION PROJECTS ACT
(Public Law 84-984)

December 12, 1990

Regional Director
Pacific Northwest Region
Bureau of Reclamation
Federal Building
Box 043-550 West Fort Street
Boise, Idaho 83724

Dear Sir:

As a result of the Northern Douglas County cooperative study for water development opportunities, the County has elected to proceed with the Milltown Hill Project on Elk Creek under the Small Reclamation Projects Act as administered by the Bureau of Reclamation.

Douglas County, Oregon hereby gives notice of its intent to apply for Federal financing under the Small Reclamation Projects Act of 1956, as amended. The following information is submitted for your consideration.

A. Douglas County was established January 7, 1852, under the laws of the State of Oregon and has the authority to contract with individuals, corporations, the State of Oregon and the United States.

B. Offices of the applicant are located in Roseburg, Oregon. The proposed project and its service area is in Douglas County and in the Fourth Congressional District.

Names of the County Commissioners are:

Joyce Morgan, Chair
Doug Robertson
Doris Wadsworth

All correspondence should be addressed to M. John Youngquist, Water Resources Coordinator, Room 103, Justice Building, Roseburg, Oregon, 97470.

C. Applicant's legal representative is Paul Nolte, County Counsel, Courthouse, Roseburg, Oregon, 97470

Applicants engineering representative is Dave Leonard P.E., Director of Public Works, Room 219, Courthouse, Roseburg, Oregon, 97470.

D. The applicant proposes to design and construct the Milltown Hill Project on Elk Creek, a tributary of the Umpqua River, in Douglas County, as shown on the attached location map.

E. The applicant would use Federal financing to construct the project, consisting of:

1. A roller compacted concrete (RCC) 190 foot high dam at the Milltown Hill site forming a 24,143 acre-foot reservoir to provide storage for:
    a. irrigation and municipal/industrial water supplies for diversion from Elk Creek downstream of the dam and from a pressure pipeline distribution system in Yoncalla and Scotts Valleys,
    b. enhancement of anadromous fish habitat in Adams, Yoncalla and Elk Creeks,
    c. flood control downstream of the dam, and
    d. reservoir recreation, fish and wildlife uses.
2. A pressure-pipeline distribution system for delivery of water for irrigation of 2,700 acres of new lands in Yoncalla and Scotts Valleys, municipal/industrial water supplies to the city of Yoncalla and the community of Rice Hill and aquatic habitat enhancement in Yoncalla and Adams Creeks.
3. Aquatic habitat improvement structures in 46 miles of Elk Creek stream channel below the dam for enhancement of anadromous fish.
4. Recreation facilities, such as boat ramps, picnic sites, sanitation facilities and hiking trails at two locations on the reservoir.

Appendix E

Distribution List for the DEIS

Milltown Hill Draft Environmental Impact Statement

Distribution List

The Draft environmental statement is being distributed for review and comment to Federal, State and Local agencies, local libraries, and to individuals involved in the proposed project and to other interested groups and individuals. During the review period, public hearings will be held in Drain, Oregon, and in Roseburg, Oregon, to receive comments on the adequacy of the statement.

I. STATEMENTS DISTRIBUTED FOR REVIEW AND COMMENT BY THE COMMISSIONER OF RECLAMATION

U.S. Department of the Interior

Bureau of Land Management, Oregon State Office, Portland, OR
Bureau of Land Management, Eugene, OR
Bureau of Land Management, Roseburg District Office, Roseburg, OR
Bureau of Indian Affairs, Portland, OR
Fish and Wildlife Service, Portland, OR
Geological Survey, Portland, OR
National Park Service, Seattle, WA
Bureau of Mines, Spokane, WA
Bureau of Surface Mining Reclamation and Enforcement, Washington D.C.
Department of Interior Library, Washington D.C.
Western Regional Office -- Secretary of the Interior

Other Federal Agencies

Advisory Council on Historic Preservation
Forest Service, Portland, OR
Soil Conservation Service, Roseburg, OR
Department of the Army, Corps of Engineers, Portland, OR
Department of Commerce, National Marine Fisheries Service, Seattle, WA
Department of Health and Human Services, Seattle, WA
Department of Housing and Urban Development, Portland, OR
HUD Regional Administrator, San Francisco, CA
Department of Labor, Washinton D.C.
Department of Transportation
    Federal Highway Administration, Portland, OR
Department of Energy, Bonneville Power Administration
Federal Energy Regulatory Commission, Washington D.C.
General Services Administration, Washington D.C.
Interstate Commerce Commission, San Fransico, CA
Environmental Protection Agency, Region X, Seattle, WA
Environmental Protection Agency, Portland, OR
Council on Environmental Quality, Washington D.C.

F:NameList

United States Senate

Mark O. Hatfield
Bob Packwood

United States House of Representatives

Les Aucoin
Ron Wyden
Mike Kopetski
Robert Smith
Peter Defazio

II. STATEMENTS DISTRIBUTED FOR REVIEW AND COMMENT BY THE REGIONAL DIRECTOR, PACIFIC NORTHWEST REGION

American Indian

Legislative Commission on Indian Services
Cow Creek Band of Umpqua Tribe
Confederated Tribes of Siletz
Confederated Tribes of Grand Ronde

State Agencies

Govenor Barbara Roberts
Department of Agriculture
Department of Environmental Quality
Department of Fish and Wildlife
Department of Forestry
Department of Human Resources
Gary Ball, District 15 Watermaster
Department of Water Resources
Martha Pagel, Assistant to the governor for Natural Resources
Department of Energy
Department of Geology and Mineral Industries
State Clearinghouse, Intergovernmental Relations Division
Environmental Health Department
Oregon State Highway Engineer
Division of State Lands
Oregon State Historic Preservation Officer
Parks and Recreation Division
Oregon Department of Land Conservation and Development
Parks and Recreation Division, Historic and Preservation Office
Oregon Natural Heritage Program
Northwest Power Planning Council
Department of Transportation, Highway Division, Region 3, Roseburg, OR

State Senators/Representatives

Peg Jolin
Bill Bradbury
Larry Campbell
Bill Markham
John Kitzahaber
Sam Dominy
Rod Johnson
Jim Witty

County

Lane County Commissioners
Douglas County Counsel
Douglas County Planning Department
Douglas County Water Resources Survey
Douglas County Commissioners
Douglas County Parks Department
Douglas County Public Works Department
Umpqua Regional Council of Governments

City

Mayor Grant Levins, City of Drain
Mayor Albert Applegate, City of Yoncalla
Mayor Stan McKnight, City of Sutherlin
Mayor Alfred A. Tyson, City of Elkton
Mayor Richard Smith, City of Oakland
Mayor Doug John, City of Roseburg

Organizations and Individuals

Oregon Rivers Council
Umpqua Basin Water Association
1000 Friends of Oregon
NW Environmental Defense Center
Oregon Environmental Council
Oregon Whitewater Enthusiasts
Oregon Wildlife Federation
OSPIRG
Southern OR. Resources Alliance
Roseburg Rod and Gun Club
Steamboaters
Salmon & Steelhead Anglers
Water Watch of Oregon
Izaak Walton League of America, Roseburg
Assoc. NW Steelheaders
Izaak Walton League of America, Portland
Oregon Chapter Sierra Club
Oregon Trout Association
Oregon Wildlife Federation

Dames and Moore, Goleta, CA
Pacific Fisheries Enhancement
Trout Unlimited
Umpqua Fisherman's Association
Umpqua Valley Audubon Society
Eagles View Management Co.
North Douglas Cutters, Inc.
Andrew Banuelos
Robert Braley
John Botwinik
Harold Crouch
William Dedmore
Gideon Jackson
Gregory Jones
Donald R. Langdon
Antoine Otten
Judith Tucker
Kathryn Weathers
Carol Whipple
Mildred Whipple
Jimmie Janik
Donna Woolley
Fred Dayton
Timothy J. Sercombe
Dale Bessett
Fred Whitford
Ron Yockim
Don Wilkinson
Dan Russell
Mabelle MacDonald

Libraries

Yoncalla Public Library
Umpqua Community College Library
Oakland Public Library
Multnomah County Library
Drain Public Library
Douglas County Library
Sutherlin Public Library

Appendix F

Threatened and Endangered Species

PN 150

JUN 19 1987

Memorandum

To: Field Supervisor, Ecological Services, Fish and Wildlife Service, Portland Field Office, 727 NE. 24th Avenue, Portland, Oregon

From: ASST. Regional Director, Bureau of Reclamation, Boise, Idaho

Subject: Request for List of Threatened and Endangered Species, Endangered Species Act of 1973, Northern Douglas County Cooperative Water Resources Study

We are requesting a list of endangered or threatened plant and animal species as required by the Endangered Species Act for the subject project. The principal feature of the project is a dam and reservoir with a capacity of 35,000 acre-feet. The dam would be located on Elk Creek in Douglas County, T. 23 S., R. 4 W., S. 4. Enclosed is a map which illustrates the location of the dam and reservoir.

Project purposes include: municipal and industrial water supply for the Yoncalla area; irrigation water for existing farmland (for conversion of dryland pasture to irrigated pasture); flood control; and instream flows for fish and wildlife.

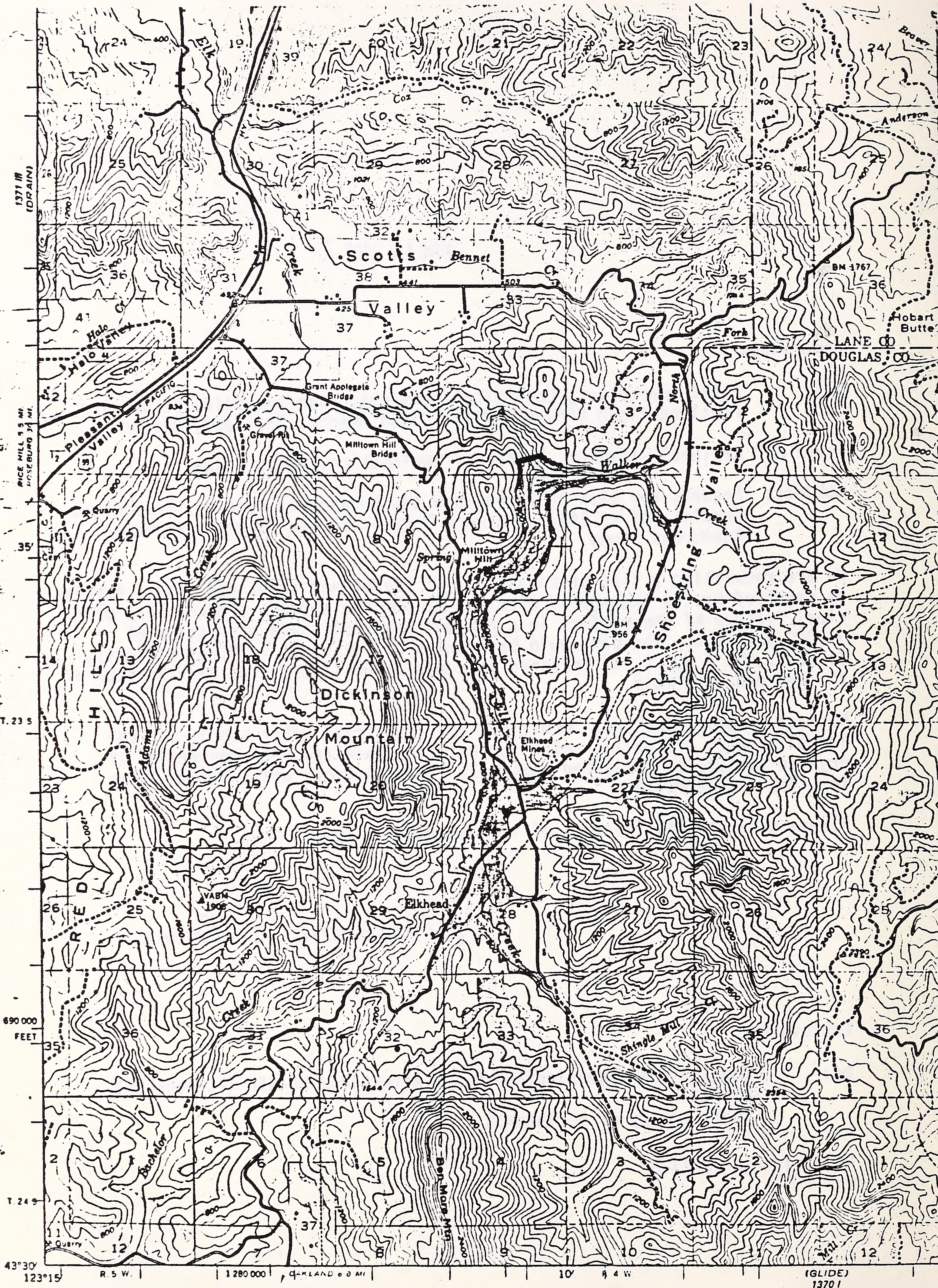
Please send the list to this office, Attention: 150.

/S/ KENNETH R. PEDDE

Enclosure

bc: Commissioner, Washington, D.C.; Attention: WO-150 (L. Roberts)
RO 730
(each w/copy of enclosure)

RA Adair:cmc 6-17-87



Mapped, edited, and published by the Geological Survey

UNITED STATES GOVERNMENT *FISH AND WILDLIFE SERVICE*
MEMORANDUM

June 29, 1987

TO: Regional Director, Bureau of Reclamation, Boise, Idaho.

FROM: Field Supervisor, Portland Field Office, Portland, Oregon

SUBJECT: Request for List for Threatened and Endangered Species, Endangered Species Act of 1973, Northern Douglas County Cooperative Water Resources Study

This is in regards to your memorandum dated June 19, 1987 and received by us on June 22, 1987 requesting a list of endangered and threatened species as required by the Endangered Species Act for the subject project.

Our Planning Aid Memorandum dated April 29, 1986 included comments and a species list for Milltown Hill Dam and Reservoir (Attachment A; case reference no: 1-7-86-I-98) pursuant to Section 7 of the Endangered Species Act. The list, which included Columbian white-tailed deer (endangered), bald eagle (threatened), and Oregon chub (candidate), is still accurate. Therefore, you may consider the comments in the "Threatened and Endangered Species" section of the our Planning Aid Memorandum, including the related Attachments A and B as our response pursuant to Section 7(c). You may begin a biological assessment if you determine this action to be a "construction project".

Roger E [illegible]
for Russell D. Peterson

NORDOUG.DH.lg.06/29/87

LISTED AND PROPOSED ENDANGERED AND THREATENED SPECIES AND CANDIDATE SPECIES THAT MAY OCCUR IN THE AREA OF THE PROPOSED ROCK QUARRY DAM AND RESERVOIR PROJECT

1-7-86-I-99

LISTED:

Columbian white-tailed deer (Odocoileus virginianus leucurus) (E)
Bald eagle (Haliaeetus leucocephalus) (T)

PROPOSED:

None

CANDIDATE:

Oregon chub (Hybopsis crameri) (2)
Rough allocarya (Plagiobothrys hirtus var hirtus) (2)

(E) -Endangered (T) -Threatened (CH) - Critical Habitat
(1) -Category 1: Taxa for which the Fish and Wildlife Service has sufficient biological information to support a proposal to list as endangered or threatened.
(2) -Category 2: Taxa which existing information indicates may warrant listing, but for which substantial biological information to support a proposed rule is lacking.

Attachment A

(ATTACHED TO THE
PLANNING AID MEMORANDUM (
OF APRIL 29, 1986

LISTED AND PROPOSED ENDANGERED AND THREATENED SPECIES AND CANDIDATE SPECIES THAT MAY OCCUR IN THE AREA OF THE PROPOSED MILLTOWN HILL DAM AND RESERVOIR PROJECT

1-7-86-I-98

LISTED:

Columbian white-tailed deer (_Odocoileus virginianus leucurus_) (E)
Bald eagle (_Haliaeetus leucocephalus_ (T)

PROPOSED:

None

CANDIDATE:

Oregon chub (_Hybopsis crameri_) (2)

(E) -Endangered (T) -Threatened (CH) - Critical Habitat
(1) -Category 1: Taxa for which the Fish and Wildlife Service has sufficient biological information to support a proposal to list as endangered or threatened.
(2) -Category 2: Taxa which existing information indicates may warrant listing, but for which substantial biological information to support a proposed rule is lacking.

Attachment A

LISTED AND PROPOSED ENDANGERED AND THREATENED SPECIES AND CANDIDATE SPECIES THAT MAY OCCUR IN THE AREA OF THE PROPOSED HAWTHORNE DAM AND RESERVOIR PROJECT

1-7-86-I-100

LISTED:

Columbian white-tailed deer (*Odocoileus virginianus leucurus*) (E)
Bald eagle (*Haliaeetus leucocephalus*) (T)

PROPOSED:

None

CANDIDATE:

Oregon chub (*Hybopsis crameri*) (2)

(E) -Endangered (T) -Threatened (CH) - Critical Habitat
(1) -Category 1: Taxa for which the Fish and Wildlife Service has sufficient biological information to support a proposal to list as endangered or threatened.
(2) -Category 2: Taxa which existing information indicates may warrant listing, but for which substantial biological information to support a proposed rule is lacking.

Attachment A

United States Department of the Interior

BUREAU OF RECLAMATION
PACIFIC NORTHWEST REGION
FEDERAL BUILDING & U.S. COURTHOUSE
BOX 043-550 WEST FORT STREET
BOISE, IDAHO 83724-0043

IN REPLY REFER TO: PN 730/150

NOV 18 1987

Memorandum

To: Field Supervisor, Ecological Services, Fish and Wildlife Service, Portland Field Office, P.O. Box 1487, Portland, Oregon 97232

From: Regional Director, Bureau of Reclamation, Boise, Idaho

Subject: Northern Douglas County Cooperative Water Resources Study, Oregon, Biological Assessment in Accordance with Endangered Species Act

Enclosed is a biological assessment on the subject project. We have concluded that the proposed project would have no adverse impact to the Columbian white-tailed deer and possible minor beneficial impact to the bald eagle and peregrine falcon. We would appreciate a written response to our conclusion based on this biological assessment.

John W. Keys III

Enclosure

bc: RO 152, 730 (w/encl.)

BIOLOGICAL ASSESSMENT OF POTENTIAL IMPACTS TO COLUMBIAN WHITE-TAILED DEER AND BALD EAGLES FROM CONSTRUCTION OF THE MILLTOWN HILL DAM AND RESERVOIR
DOUGLAS COUNTY, OREGON

I. PROJECT DESCRIPTION

The Elk Creek drainage in Northern Douglas County, Oregon, suffers from a poor ground-water resource and low summer stream flows. The low summer flows result from low rainfall during the months of June, July, and August. These water resource limitations constrain urban, industrial, and agricultural growth and development. The low stream flows adversely impact the stream fishery and water quality.

During the past two decades, Douglas County has investigated several alternatives to remedy their water-related problems. Their present study, in which they are cooperating with the Bureau of Reclamation, focuses on a multipurpose storage facility on Elk Creek approximately 4 miles north of Elkhead, just below the confluence with Walker Creek (see attached map).

The plan now under consideration includes a storage facility that would impound a maximum of 36,000 acre-feet of water. A pipe system would supply water under gravity pressure to the communities of Yoncalla and Rice Hill for municipal, industrial, and small tract (less than 10 acres) irrigation. This system would also provide water to irrigate lands in the Yoncalla and Scotts Valleys. Farmland receiving irrigation for the first time would total about 4,520 acres, and another 822 acres would receive a supplemental water supply. About 3,300 acre-feet of storage would be reserved for instream flows primarily to enhance steelhead trout and coho salmon production. The reservoir would also result in some flood control benefits to the city of Drain.

The reservoir would inundate up to 845 acres of private land. New lands acquired for wildlife mitigation purposes would include several small plots of 2.5 to 5 acres for big game and about 70 acres for upland game habitat enhancement. These lands would be adjacent to the reservoir area. About 190 acres of wetland habitat would be created by construction of a subimpoundment near the upper end of the reservoir, and would enhance waterfowl and several species of nongame wildlife. The Oregon Department of Fish and Wildlife (ODFW) has recommended leaving "all live and dead trees in and around the reservoir for nesting, perching or other uses by osprey, eagles and other nongame wildlife until it can be determined what and if any vegetation must be removed" (George Keister/Jim Collins, ODFW, personal communication). This recommendation will be considered in formulating mitigation plans for the project.

Recreation associated with the reservoir would include about 30 picnic units, a boat ramp, and 30 camping units. The recreation plan would probably limit boat speeds to 5 miles per hour and include a warm water fishery. The upstream end of the reservoir would provide dispersed, consumptive, and nonconsumptive recreation opportunities associated with the wetlands area.

II. DESCRIPTION OF THE ENVIRONMENT

Vegetation in the proposed reservoir area consists of a mix of coniferous forest (Douglas fir), mixed coniferous/deciduous forest (fir, madrone, Oregon white oak), and small stands and riparian strips of deciduous forest (primarily oak and willow). Most of the area is in private ownership and consists of pasture and brushy clearings.

According to information provided by the Portland Field Office of the U.S. Fish and Wildlife Service (FWS)(1), the area supports black-tailed deer (estimated density 30 deer/square mile), Roosevelt elk, coyote, bobcat, mink, beaver, muskrat, and opossum. The primary upland game species are band-tailed pigeon and turkey with smaller numbers of blue and ruffed grouse, ring-necked pheasant, mountain and valley quail, and mourning doves. Waterfowl use is very limited because of the lack of wetland habitat.

A list of threatened and endangered species was provided in a FWS Planning Aid Memorandum (PAM) in April, 1986, (1) and confirmed in a memorandum dated June 29, 1987 (2). Two species were listed that may occur in the project area; the Columbian white-tailed deer (Odocoileus virginianus leucurus) as endangered, and the bald eagle (Haliaeetus leucocephalus) as threatened. In addition, the Oregon chub (Hybopsis crameri) is listed as a category 2 candidate species.

The ODFW has reported the presence of the American peregrine falcon (Falco peregrinus anatum) in the Sutherlin area near Plat I and Cooper Creek Reservoirs over several past winters as well as an active eyrie along the North Umpqua above Steamboat Creek. This species, federally listed as endangered, should be added to the FWS list for the project area.

The Columbian white-tailed deer is one of 30 subspecies of white-tailed deer found in North and Central America (3). Originally found in lowlands of southwestern Washington and western Oregon, this subspecies is now found in only two locations. One population estimated at 300-350 is found on and adjacent to the Columbian White-tailed Deer National Wildlife Refuge in Washington near the mouth of the Columbia River (4). The other population is estimated at 3,000 deer and inhabits about 465 square miles of oak woodland within the interior valleys of the Umpqua River Basin (5).

A recent study (3) demonstrated that Columbian white-tailed deer preferred grass-shrub, oak-savanna, open oak, closed oak, riparian, and conifer habitats; they utilized grassland, oak-conifer, oak-madrone, and madrone habitats less frequently. Lowland riparian systems were shown to be a very important component in all life stages of the species as well as serving as corridors for dispersal and geographic expansion (3). Maximum deer densities occurred in areas of about 50 percent woodland cover (3). Columbian white-tailed deer and black-tailed deer showed a local geographic and ecological segregation throughout the study area (3,4).

The highest densities of white-tailed deer in Douglas County are found along the North Umpqua River between Glide and Wilbur (3). They are found in the Calapooya Creek drainage adjacent to the Elk Creek drainage, but are not known to occur in Elk Creek. There are no current plans to introduce this species into the Elk Creek drainage (personal communication with George Keister, ODFW, Roseburg).

Bald eagles nest and winter in several locations throughout western Oregon. Oregon has the second highest population of nesting bald eagles in the seven-state Pacific bald eagle recovery area (Washington, Oregon, California, Idaho, Nevada, Montana, and Wyoming) (6). There are currently about 11 active bald eagle nesting territories in Douglas County, including one on the North Umpqua River northeast of Roseburg, two in the Cascade Mountains, and eight along the lower Umpqua River (personal communication with Jim Collins, ODFW, Roseburg). The U.S Fish and Wildlife Service (FWS) Pacific Bald Eagle Recovery Plan (6) states there are no bald eagles using the project area at this time. However, George Keister and Jim Collins (ODFW, personal communication) reported that ODFW winter raptor surveys along the North Umpqua in January have consistently recorded one to two adults within the reach between Wilber and Glide.

According to the Pacific Bald Eagle Recovery Plan (6), the primary threats to bald eagle populations in Zone 12 (Willamette/Umpqua Basins) include logging, human disturbance, and shooting. The proposed management directions outlined in the Recovery Plan are to "identify and protect nesting and feeding areas" and "manage potential nesting habitat for eagles."

As previously mentioned, the American peregrine falcon, one of three subspecies of the peregrine falcon, breeds and winters in northern Douglas County. The peregrines' preferred nesting habitat is in canyons with steep walls. It preys heavily on waterfowl, shorebirds, and other birds. This species suffered sharp population declines beginning in the 1950's largely because of the widespread use of organochlorine pesticides. The banning of the use of such pesticides coupled with activities such as the reintroduction of captive-bred peregrines into the wild is resulting in an increasing population nationwide.

The Pacific Coast Recovery Plan for the peregrine falcon has targeted 30 breeding pairs for its recovery goal in Oregon (7). Several management options presented in the plan include prevention of nestsite disturbance; manipulation of the wild population; continuous inventory, study, and monitoring of the wild population; identification of habitat needs; investigation of mortality factors such as shooting, powerline collisions, disease, parasitism, and predation; identification of habitat needs, including foraging areas; evaluation of suitability of historical and potential nest sites; recommendation of critical habitats; and implementation of a public information and education program (7).

III. ENVIRONMENTAL IMPACTS AND MITIGATING MEASURES

Since the Columbian white-tailed deer is not presently found in the project area, the project would have no impact on existing populations. Measures to mitigate for black-tailed deer and other wildlife species on lands adjacent to the proposed reservoir may provide limited habitat for the white-tailed deer if it should eventually spread its range into the Elk Creek Drainage.

Construction of a reservoir at the Milltown Hill site could result in an increase of the prey base for the bald eagle. The proposed wetland area should increase waterfowl production and wintering habitat in an area that presently has little of either. The reservoir would be managed for a resident fishery which would also create a potential food source for bald eagles. Current plans call for the retention of several large trees in the area which could function as both nest sites and perches. It would be important to protect any nesting bald eagles that may eventually establish territories in the project area; this possibility should be addressed in a reservoir management plan.

Construction of the Milltown Hill Reservoir and creation of a wetland area could also benefit prey species (primarily ducks and shorebirds) for the peregrine falcon.

IV. CONCLUSIONS

We feel the construction of a reservoir at the Milltown Hill site would have no present impact to the Columbian white-tailed deer and could have a minor beneficial impact to the bald eagle by creating potentially suitable nesting and feeding habitat and to the peregrine falcon by enhancing this species' prey base.

LITERATURE CITED

1. U.S. Fish and Wildlife Service. Planning Aid Memorandum to Bureau of Reclamation dated April 29, 1986: "Elk and Calapooya Creeks Project, Douglas County, Oregon." 24 pages.

2. U.S. Fish and Wildlife Service. Memorandum to Bureau of Reclamation dated June 29, 1987: "Request for List of Threatened and Endangered Species, Endangered Species Act of 1973, Northern Douglas County Cooperative Water Resources Study."

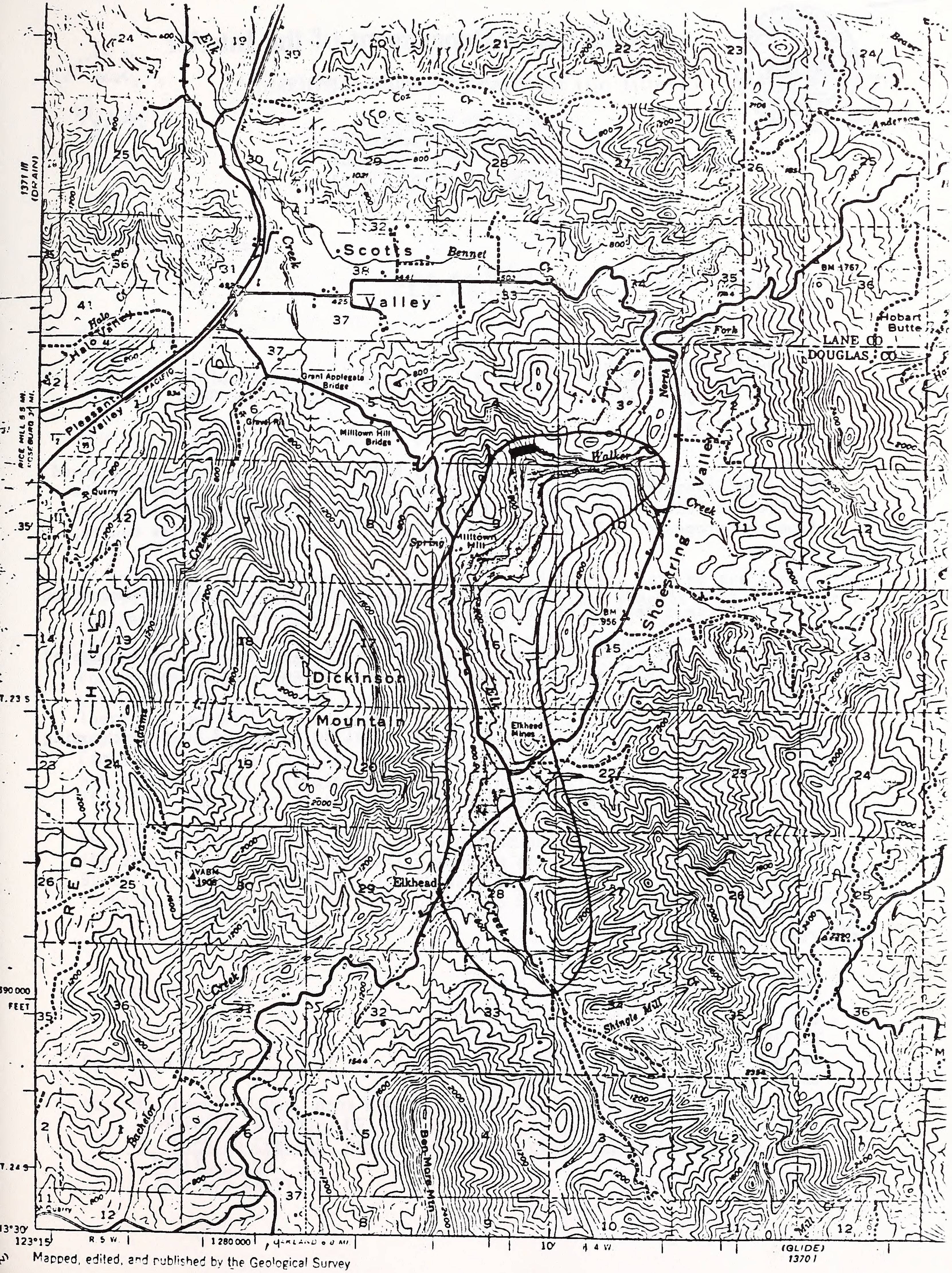
3. Smith, W. P. 1981. Status and Habitat Use of Columbian White-tailed Deer in Douglas County, Oregon. Phd dissertation. 273 pages.

4. Smith, W. P. 1987. Dispersion and Habitat Use By Sympatric Columbian White-tailed Deer and Columbian Black-tailed Deer. J. Mamm 68(2): 337-347.

5. Smith, W. P. 1985. Current geographic distribution and abundance of Columbian white-tailed deer, Odocoileus virginianus leucurus (Douglas). Northwest Sci., 59:243-251.

6. U.S. Fish and Wildlife Service, 1986. Recovery Plan for the Pacific Bald Eagle. U.S. Fish and Wildlife Service, Portland, Oregon. 160 pages.

7. The Pacific Coast American Peregrine Falcon Recovery Team. 1982. Pacific Coast Recovery Plan for the American Peregrine Falcon. 87 pages.



Mapped, edited, and published by the Geological Survey

March 3 1849

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Portland Field Office
727 NE 24th Avenue
Portland, OR 97232

December 22, 1987

Re: 1-7-88-I-20

John W. Keys, III
U. S. Bureau of Reclamation
Box 043-550 West Fork Street
Boise, ID 83724-0043

Dear Mr. Keys:

This is in response to your letter dated November 18, 1987 that was received by us on November 27, 1987, transmitting your biological assessment of the impacts on Columbian White-tailed Deer, Peregrine Falcons, and Bald Eagles from the proposed MillTown Hill Dam and Reservoir Project, Douglas County, Oregon.

We have reviewed the biological assessment and concur with your determination of no adverse effect on the above species.

The requirements established under Section 7(a)(2) and 7(c) of the Endangered Species Act of 1973, as amended, have been met, thereby concluding the consultation process.

Our comments regarding wildlife mitigation will be addressed in a forthcoming report.

We appreciate your concerns for listed species.

Sincerely,

fr
Russell D. Peterson
Field Supervisor

DS:lg

cc:
R1 FWE-SE
PFO-ES
ODFW (Nongame) Portland, Roseburg

United States Department of the Interior

BUREAU OF RECLAMATION
PACIFIC NORTHWEST REGION
FEDERAL BUILDING & U.S. COURTHOUSE
BOX 043, 550 WEST FORT STREET
BOISE, IDAHO 83724-0043

PN 152

FEB 28 1991

Memorandum

To: Field Supervisor, Ecological Services, Portland Field Office, 2600 S.E. 98th Avenue, Suite 100, Portland OR 97266

From: Regional Environmental Officer, Bureau of Reclamation, Boise ID

Subject: Request for List of Threatened and Endangered Species Under the Endangered Species Act of 1973, Milltown Hill Project, Oregon (Endangered Species Act)

In accordance with Section 7 of the Endangered Species Act, we are requesting a list of threatened and endangered plant and animal species that could occur in the Milltown Hill Dam and Reservoir project area. This project, if approved, would be constructed by Douglas County, Oregon, under the Bureau of Reclamation's (Reclamation) Small Reclamation Projects Act. To meet NEPA compliance, Douglas County has hired Campbell-Craven Environmental Consultants to prepare an environmental assessment for the project. Therefore, we wish to designate Campbell-Craven as a non-federal representative responsible for writing the Section 7 biological assessment. Campbell-Craven is in concurrence with that request. Once Campbell-Craven has assembled the biological assessment, Reclamation will review and finalize it before forwarding it to your agency for consultation.

We have included a brief description of the project, plus maps illustrating the dam, reservoir, and irrigation service area and a map showing the Holbart Butte rock quarry location. If you have any questions concerning this request, please call Richard Prange at FTS 554-1208.

RICHARD H. PRANGE

Enclosure

cc: Mr. Lowell Hayes, Area Manager, Bureau of Land Management, Roseburg District, Roseburg OR
Mr. Richard Cravens, Campbell-Craven Environmental Consultants, Portland OR
(all w/o encl)

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Portland Field Station
2600 S.E. 98th Avenue, Suite 100
Portland, Oregon 97266

March 28, 1991

Re: 1-7-91-SP-53

Richard Prange
Bureau of Reclamation
Pacific Northwest Region
Federal Building and U.S. Courthouse
Box 043-550 West Fort Street
Boise, Idaho 83724-0043

Dear Mr. Prange:

As requested by your letter, dated February 28, 1991, and received by us on March 4, 1991, we have attached a list (Attachment A) of endangered and threatened species that may be present within the area of the proposed Milltown Hill Dam and Reservoir project area. The list fulfills the requirement of the Fish and Wildlife Service under Section 7(c) of the Endangered Species Act of 1973, as amended (16 USC 1531 et.seq.). Your requirements under the Act are outlined in Attachment B.

The northern spotted owl was listed by the U.S. Fish and Wildlife Service as threatened in July 1990. We have no specific occurrence data on the spotted owl for your area, but encourage you to contact the Oregon Department of Fish and Wildlife or the Roseburg District of the Bureau of Land Management for available information. An assessment should be made as to whether your activities will affect spotted owl habitat. Survey guidelines have been developed and are enclosed.

Should your biological assessment determine that a listed species is likely to be adversely affected by the project, the Bureau of Reclamation should request formal section 7 consultation through this office. Even if the biological assessment shows a "no effect" or "beneficial effect" situation, we would appreciate receiving a copy for our information.

We have also included a list of candidate species presently under review by this Service. Candidate species have no protection under the Endangered Species Act but are included for your consideration as it is possible candidates could become formal proposals and be listed prior to project completion. If you determine your project may affect candidate species, you are not required to perform a biological assessment or to consult with the Fish and Wildlife Service. If early evaluation of your project indicates that it is likely to adversely impact a candidate species, the Service recommends that the Bureau of Reclamation request technical assistance from this office.

Rough Allocarya, a Category 1 candidate plant, is currently a high priority species for listing by the Service. To the best of our knowledge, surveys have not been conducted to determine the presence of this species in the project area. Surveys would provide a better information base upon which to evaluate impacts of your project on the rough allocarya. A brief description of the plant, its phenology, and habitat association has been provided (Attachment C). Further information on this particular species can be obtained from the Natural Heritage Program in Portland, Oregon.

There is also concern with the Umpqua chub, formerly the Oregon chub (*Oregonichthys crameri*). Current and potential activities in the Elk Creek drainage include bank stabilization (riprapping), flood control, and the introduction of nonindigenous warmwater fishes. These same activities led to the decline of *O. crameri*, a species currently under petition for listing as endangered, in the Willamette River drainage.

Your interest in endangered species is appreciated. If you have any additional questions regarding your responsibilities under the Act, please contact Gary Miller at our office, phone (503) 231-6179 or FTS 429-6179. All correspondence should include the above referenced case number.

Sincerely,

Russell D. Peterson

Russell D. Peterson
Field Supervisor

Attachments

cc: Mr. R. Cravens, Campbell-Craven Environmental Consultants, Portland, OR
PFO-ES
ODFW (Nongame)
BLM (Roseburg)
ONHP

ATTACHMENT A

LISTED AND PROPOSED ENDANGERED AND THREATENED SPECIES AND CANDIDATE SPECIES THAT MAY OCCUR IN THE AREA OF THE PROPOSED MILLTOWN HILL DAM AND RESERVOIR PROJECT IN DOUGLAS COUNTY, OREGON

1-7-91-SP-53

LISTED SPECIES[1/]

Northern spotted owl[2/] *Strix occidentalis caurina* (T)

PROPOSED SPECIES

None

CANDIDATE SPECIES

Umpqua chub (2) *Oregonicthys kalawetseti* (D)
Species has been located in the Elk Creek Drainage

Western pond turtle (2) *Clemmys marmorata*
Species has been located in the Elk Creek Drainage

Rough Allocarya (1) *Plagiobothrys hirtus* var. *hirtus*
Species has been located in boggy, marshy sites in grasslands

(E) - Endangered *(T) - Threatened* *(CH) - Critical Habitat*

(S) - Suspected *(D) - Documented*

(1) - Category 1: Taxa for which the Fish and Wildlife Service has sufficient biological information to support a proposal to list as endangered or threatened.

(2) - Category 2: Taxa for which existing information indicates may warrant listing, but for which substantial biological information to support a proposed rule is lacking.

(3A)- Category 3A: Taxa for which the Service has persuasive evidence of extinction.

(3B)- Category 3B: Names that on the basis of current taxonomic understanding do not represent taxa meeting the Act's definition of "species."

[1/] *U. S. Department of Interior, Fish and Wildlife Service, April 15, 1990, Endangered and Threatened Wildlife and Plants, 50 CFR 17.11 and 17.12.*

[2/] *Federal Register Vol. 55, No. 123, June 26, 1990 Final Rule-Northern Spotted Owl*

[3/] *Federal Register Vol. 54, No. 4, January 6, 1989 Notice of Review-Animals*

[4/] *Federal Register Vol. 55, No. 35, February 21, 1990 Notice of Review-Plants*

CAMPBELL-CRAVEN
ENVIRONMENTAL CONSULTANTS

Environmental Reports
Permit Coordination
Baseline Studies
Ecological Analyses

9170 S.W. Elrose
Tigard, Oregon 97224
Phone (503) 639-7200
FAX (503) 620-1657

December 10, 1990

File

Ms. Theresa Weber
Oregon Natural Heritage Data Base
1205 N.W. 25th Avenue
Portland Oregon 97210

SUBJECT: Milltown Hill Project, Threatened and Endangered Species Assessment.

Dear Ms. Weber:

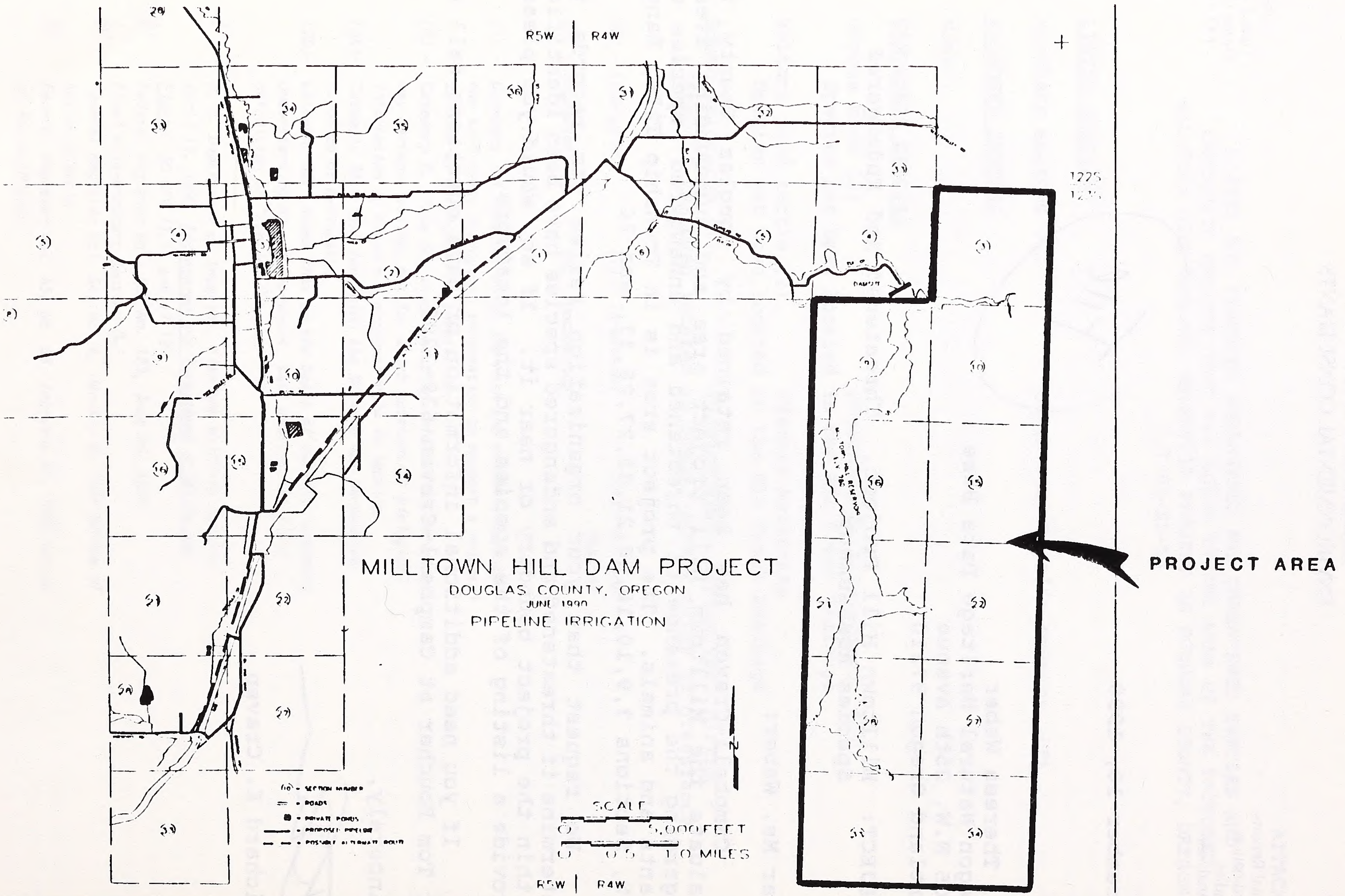
Campbell-Craven has been retained by Douglas County to evaluate the Milltown Hill project area and surrounding areas regarding the presence of threatened and endangered species of plants and animals. The project area is in Township T23S, Range R4W, Sections 3,9,10,15,16,21,22,27,28,33, and 34.

We request that your organization review its records to determine if threatened and endangered species have been identified within the project boundary or near it. If so, would you please provide a listing of the species and the locations.

If you need additional information or have questions call me or Tom Boucher at Campbell-Craven 639-7200.

Sincerely,

Richard E. Craven



MILLTOWN HILL PROJECT

Oregon Natural Heritage Data Base

1205 NW 25th Avenue
Portland Oregon 97210
503 229 5078

January 4, 1991

Campbell Craven
Attn: Tom Boucher
9170 SW Elrose
Tigard, OR 97224

Dear Mr. Boucher,

There were no elements in our system of rare, threatened or endangered species for the area designated in your request; Township 23s, Range 4w, sections 3, 9, 10, 15, 21, 22, 27, 28, 33 and 34.

However, please remember that an absence of information in a given area does not mean there are no rare, threatened or endangered species there.

Also enclosed is the invoice for the search.

Sincerely,

Theresa Weber

Theresa Weber
Data handler

CAMPBELL-CRAVEN
ENVIRONMENTAL CONSULTANTS

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oordination
Studies
ical Analyses

9170 S.W. Elrose
Tigard, Oregon 97224
Phone (503) 639-7200
FAX (503) 620-1657

March 27, 1991

Mr. Russell Peterson
U.S. Fish and Wildlife Service
2600 S.E. 98th Avenue
Suite 100
Portland, OR 97266

Subject: Proposed Milltown Hill Project
Elk Creek, Umpqua River, Oregon
Section 7 Consultation

Dear Mr. Peterson:

We have not received the list of threatened or endangered species from USFWS however, I have confirmed that the spotted owl will be included. A proposed scope of work has been prepared to address Section 7 Consultation for the proposed project.

Please review the scope and provide your written response as to the adequacy of the scope to address Section 7 Consultation.

Sincerely,

Richard E. Craven

cc Lowell Hayes, BLM
Jim Fessler, ODFW

RECEIVED
MAR 29 1991
PORTLAND FIELD STATION

SCOPE OF WORK FOR CONDUCTING SPOTTED OWL SURVEYS IN THE VICINITY OF PROPOSED MILLTOWN HILL DAMSITE (SW1/4 SE1/4, SECTION 4, T.23S., R.4W., W.M.)

1.0 Area of Survey

Suitable Spotted Owl habitat within 1.2 miles from the perimeter of the proposed dam site will be surveyed.

2.0 Number and Timing of Surveys

As project activity may begin in early 1992, a one year census involving six visits is proposed. The first survey will be conducted during the end of April 1991, with subsequent visits made at 2-3 week intervals. Four of the visits will be conducted before the 30th of June.

3.0 Survey Method

Census points will be established (See attached map), which provides complete audio coverage of the survey area. After sunset, a minimum of ten minutes will be spent at each census point imitating and listening for Spotted Owl calls. If owls respond during the nightime survey, a daytime follow-up survey will be conducted to determine bird status and activity center.

Some proposed census points may not be callable due to private ownership and potential disturbance of domestic dogs in nearby residences. In these situations alternative stations or daytime surveys may be required.

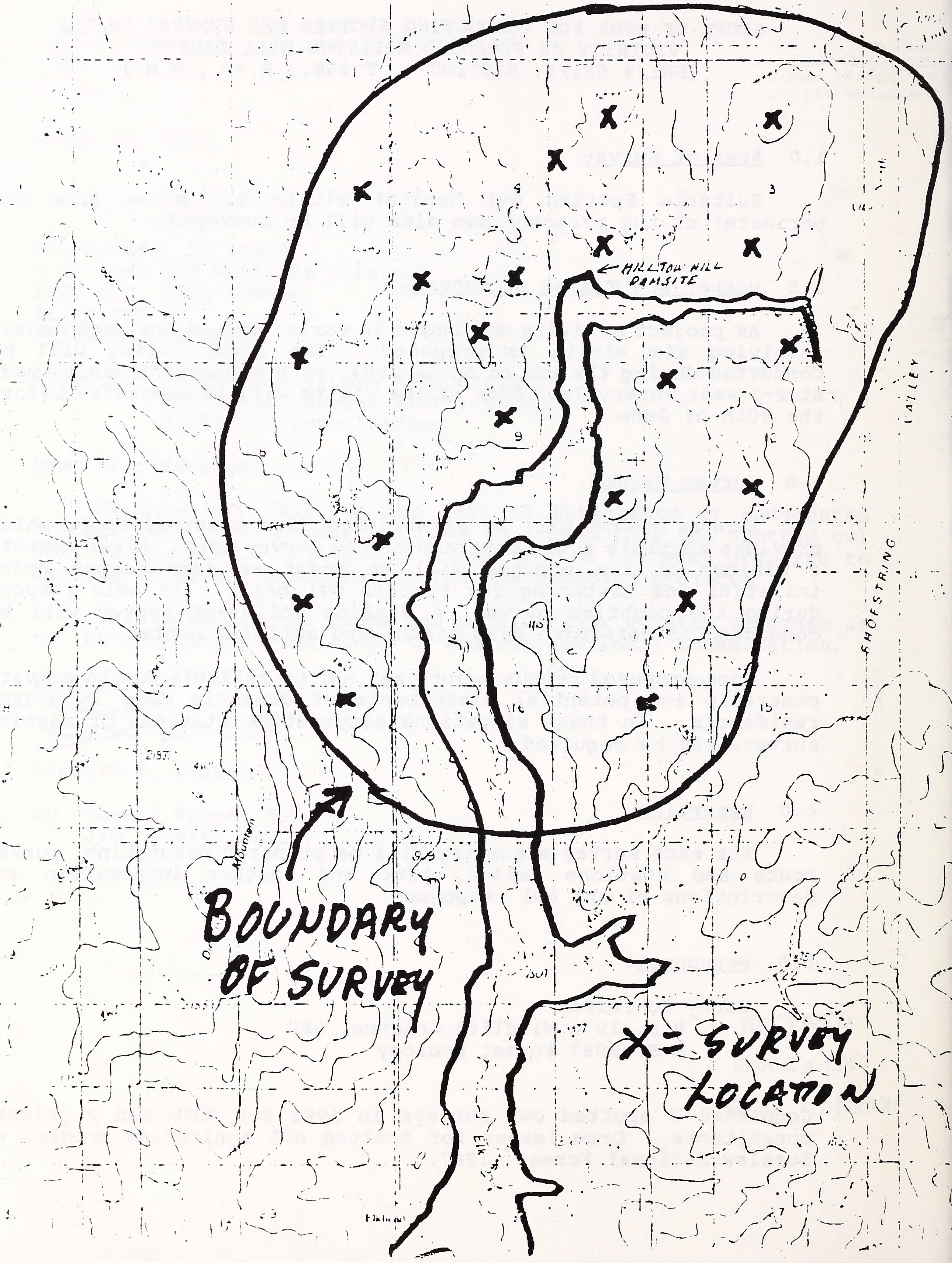
4.0 Reporting

For each survey a summary will be prepared describing: survey route and stations called, time and weather information and descriptions of any owl responses.

5.0 Personnel:

Barry Schreiber
B.S. 1976 Wildlife Science, OSU
M.S. 1987 Forest Ecology

Completed 3 spotted owl surveys in 1990 for ODFW and 2 private consultants. Crew leader for spotted owl monitoring program on Surslaw National Forest, 1987.


HILLTOW HILL DAMSITE
VALLEY
SHOESTRING
BOUNDARY OF SURVEY
X = SURVEY LOCATION

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Portland Field Station
2600 S.E. 98th Avenue, Suite 100
Portland, Oregon 97266

April 26, 1991

1-7-88-I-20-GM

Richard E. Craven
Campbell-Craven Environmental Consultants
9170 S.W. Elrose
Tigard, Oregon 97224

Dear Mr. Craven:

This is in response to your letter of March 27, 1991, and received in this office on March 29, 1991, regarding spotted owl survey efforts on the Milltown Hill Project.

The scope of the survey effort appears to follow the guidelines recently released by the Service. A copy of the survey guidelines is enclosed and we recommend you follow the guidelines to assess whether spotted owls will be affected by the Milltown Hill project.

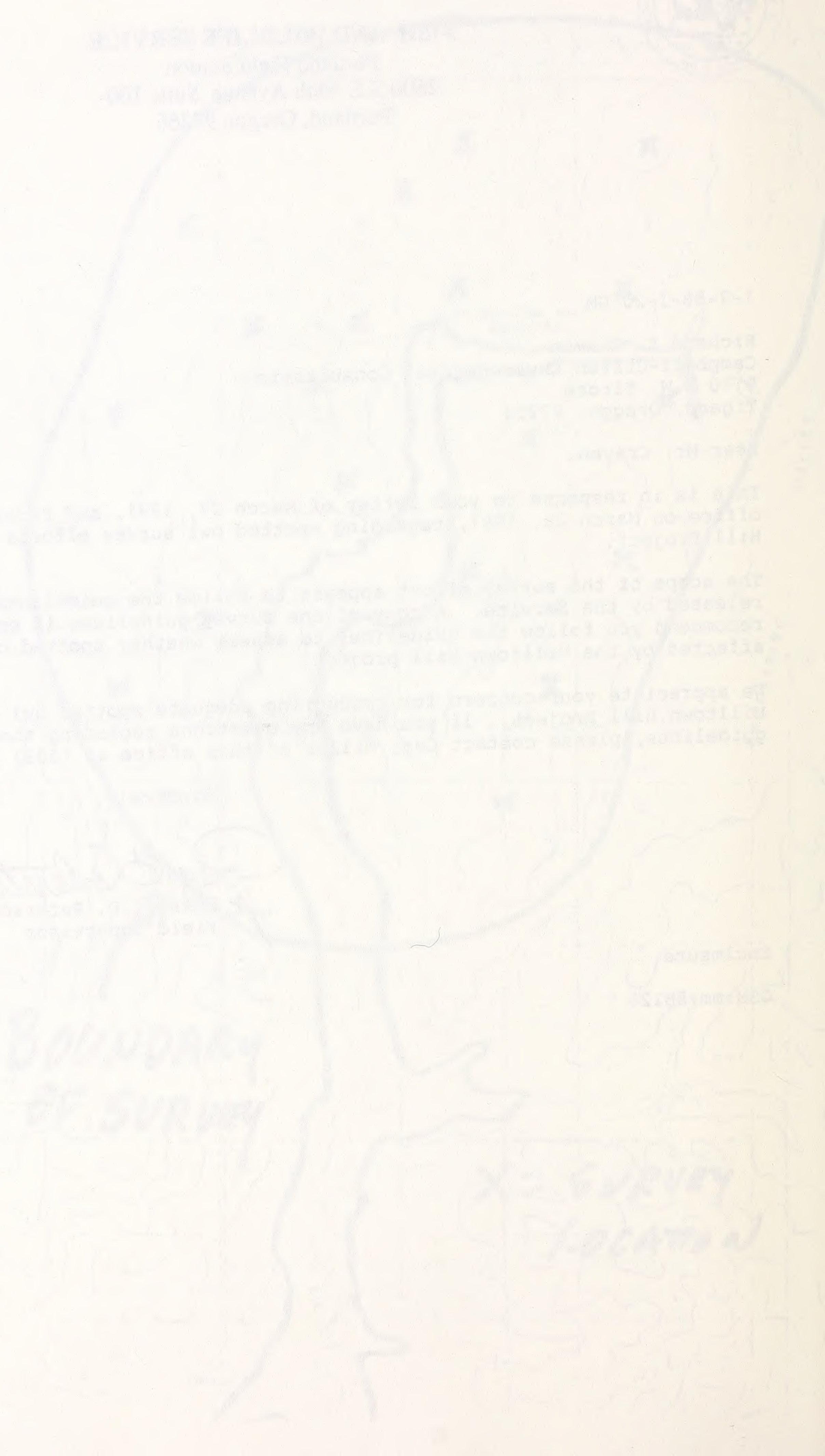
We appreciate your concern for conducting adequate spotted owl surveys for the Milltown Hill Project. If you have any questions regarding the survey guidelines, please contact Gary Miller of this office at (503) 231-6179.

Sincerely,

Roger E Dollerstrasse
fc Russell D. Peterson
Field Supervisor

Enclosure

GSM:mm:88I20


Boundary of Survey
X – Survey Location

Appendix G

Acronyms

ACRONYMS

AAHU - average annual habitat units
BEA - Bureau of Economic Analysis
BLM - Bureau of Land Management
BM - Bureau of Mines
CEQ - Council on Environmental Quality
CFS - cubic feet per second
COE - Corps of Engineers
GPCPD - Gallons per capita per day
DCWRS - Douglas County Water Resources Survey
EIS - Environmental Impact Statement
EO - Executive Order
EPA - Environmental Protection Agency
ESA - Endangered Species Act of 1970
FIA - Federal Insurance Administration
ft^3/s - Cubic feet per second
g - gravity
GS - Geological Survey
HEP - Habitat Evaluation Procedure
HSI - Habitat Suitability Index
IFIM - Instream flow incremental methodology
mg/l - milligrams per liter
M&I - Municipal and industrial (water)
MFP - Management Framework Plan
MILS - Mineral Industry Location System
MOA - Memorandum of agreement
MOU - Memorandum of understanding
MSL - mean sea level
NEPA - National Environmental Policy Act of 1969
NMFS - National Marine Fisheries Service
NPS - National Park Service
O&C - Oregon and California revested lands
ODEQ - Oregon Department of Environmental Quality
ODF - Oregon Department of Forestry
ODFW - Oregon Department of Fish and Wildlife
ODLCD - Oregon Department of Land Conservation and Development
ODOT - Oregon Department of Transportation
ODWR - Oregon Department of Water Resources
ppb - parts per billion
ppm - parts per million
PSD - Prevention of Significant Deterioration
RCC - Roller-compacted concrete
RM - river mile
RVI - relative value index
SCS - Soil Conservation Service
SHPO - State Historic Preservation Office
SMSA - Standard metropolitan statistical areas